‘Soft’ and ‘Hard’ Climate Policy Instruments: Policy Effectiveness in Australia?

by

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Declaration

This thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in this thesis, and to the best of my knowledge and belief the thesis contains no material previously published or written by another person, except where due acknowledgement is made in the text of the thesis.

Akihiro Nakamura
March 2011

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Abstract

A key issue for climate policy, central to this thesis, is the right choice of policy and the appropriate balance between non-coercive and coercive instruments (i.e. regulatory, voluntary, economic and information instruments) - referred to as 'soft' and 'hard' instruments in this thesis. Leaders in every country are seeking to make the right choices of instruments at the domestic and international levels, and a study on instrumental coerciveness is necessary for improving these decisions. However, there has not yet been a method developed for simply defining the influences of 'soft' and 'hard' instruments in terms of reducing GHG emissions. Especially when mixed instruments are involved, both the level of coerciveness and the effectiveness of 'soft' and 'hard' instruments are difficult to distinguish.

This thesis involves creating new assessment methods: Identification & Trend Analysis/ Method is developed to assess how a nation allocated its adoption of 'soft' and 'hard' instruments over a certain period; and Effectiveness Analysis/ Method is developed to examine the effectiveness of the 'soft' versus 'hard' policy instruments, in order to evaluate influences in terms of reducing GHG emissions. These two innovative methods will allow policy makers to be able to identify 'soft' and 'hard' instruments, and their trend uses and effectiveness, in relation to climate policy.

This thesis also undertakes empirical studies, firstly by looking closely at Australian climate policy under the Australian government during 1997-2007. The domestic policy of this era reflects Australia's carbon intensive circumstances, and its need for a significant reduction in GHG emissions. However, in this period Australia was largely reliant on voluntary based actions, at a time when the rest of the world was demanding strong initiatives from developed nations. Identification & Trend Analysis/ Method, and Effectiveness Analysis/ Method are applied in the Australian context for assessing the influences of 'soft' and 'hard' instruments. This analysis also reveals whether the policy with voluntary based actions encourage a significant reduction of GHG emissions.

The thesis finds that large numbers of policy instruments used in Australia's climate policy during 1997-2007 were mixed instruments. The thesis also finds that Australia's national initiatives on the policy during the period examined were largely reliant on relatively 'soft' instruments, and showed a tendency to increase the use of softer instruments over time. In terms of the effectiveness of instruments, although the overall emission trends showed the country increased emissions over this time, the few 'hard' instruments employed were relatively more effective than 'soft' instruments. The results also show that policy based on voluntary-based instruments during 1997-2007 did not encourage a significant reduction of GHG emissions. The thesis concludes that although 'hard' instruments in Australia seem to be more effective than 'soft' instruments, the influences of 'soft' and 'hard' instruments may vary elsewhere depending on circumstances.

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Abbreviations

GHG(s)	Greenhouse Gas(es)
IPCC	The Intergovernmental Panel on Climate Change
UNFCCC	The United Nations Framework Convention on Climate Change
SIA	Synthesised Instrument Analysis
GCP	The Greenhouse Challenge Program
GCP Plus	The Greenhouse Challenge Plus
MRET	The Mandatory Renewable Energy Target
DSHCI	Determination of 'Soft' and 'Hard' Climate Instruments
CCPIC	Classification of Climate Policy Instrument Categories
R&D instruments	Research and Development instruments
AGO	The Australian Greenhouse Office
NGS	The National Greenhouse Strategy
CWLTH	The Commonwealth Government
NEM	The National Electricity Market

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Chapter One
Introduction

1.0 Introduction

The Intergovernmental Panel on Climate Change [IPCC] concluded that climate change is 'unequivocal'. They have declared with more than 90 percent confidence that human activity is the main driver. The major cause of the increase in GHG [Greenhouse Gas] emissions must therefore be considered immediately. More an effective policy option is one of the key solutions to the problem (IPCC 2007). An effective GHG mitigation policy in turn requires the use of a variety of policy instruments to cope with the many related activities dealing with climate change in each nation (UNFCCC 2007).

Policy instruments are recognised tools of government in the field of public policy (Howlett 1991). These tools are designed and implemented by policy makers in order to achieve a particular policy target (Vedung and van der Doelen 1998; Carter 2001; Lascoumes et al. 2007). Climate change policy requires policy makers to employ sophisticated and complicated combinations of policy instruments to implement the most effective policy action for an immediate reduction of GHG emissions, considering economic, social, environmental, local and global interests [i.e. circumstances of national economic growth, cost and benefits, international obligations (the Kyoto Protocol) and the global financial crisis]. In order to deal with these complex issues, a variety of policy instruments and programs has been designed by policy makers worldwide. However, choosing the right instruments and programs to reduce GHG emissions is still problematic, and the influence of these instruments is still poorly understood (UNEP 2007).

A key issue for climate change policy, central to the current thesis, is the right choice of policy with the appropriate balance between non-coercive and coercive instruments (i.e. voluntary and regulatory-based instruments). These are referred to as 'soft' and 'hard' instruments[1] in this thesis. However, a method has not yet been developed for simply defining the influences of 'soft' and 'hard' instruments on reducing GHG emissions. Leaders in each country are seeking to make the right choices at domestic and international levels, and a study such as this thesis presenting on 'soft' and 'hard' instruments is necessary for improving these decisions. Nowhere is this more evident than in the case of Australia.

In December 1992, Australia signed the United Nations Framework Convention on Climate Change [UNFCCC]. Australia is a developed country and one of the most carbon intensive countries in the world. The UNFCCC suggests immediate action to reduce GHG emissions at the domestic level which will also contribute to reducing emissions globally. The Australian government discussed the idea and sought the most effective policy instruments to respond to international obligations. In December 1997, at the third Conference of the Parties to the UNFCCC in Japan, the Kyoto Protocol was agreed, and it again emphasised the international response to climate change, including the introduction of greenhouse gas emission commitments for some signatories. However, the Australian government signalled its intention to respond to international obligations via a number of voluntary-based instruments, while continuing not to ratify the international carbon reduction obligation inherent in the Kyoto Protocol during the period 1997-2007.

One of the major criticisms of Australian government initiatives is whether voluntary-based instruments actually encourage domestic action to reduce GHG emissions (CWLTH 2000; Hon *et al.* 2002; Curran 2003; ANAO 2004; Hunt 2004; Christoff 2005; Sullivan 2007 and Crowley 2007). The influence of 'soft' and 'hard' instruments has become a critical question in Australia. Moreover, a critical carbon intensive developed country such as Australia must consider a significant reduction in GHG emissions and must be responsible even for leading a strong global response. Given this, there is a compelling need for an evaluation of the effectiveness of 'soft'

[1] All instruments contain a certain level of coerciveness and are based on two individual streams: 'mandated and voluntary' (Hatch 2005). This supports the notion of 'soft' and 'hard' instruments adopted in this study. Each instrument should be positioned based on its level of coercion (i.e. the degree of 'soft' and hard' instruments in this thesis is viewed according to the level of government power and intervention, legal binding and penalties).

and 'hard' instruments in Australia's own greenhouse policy. This study intends not only to help better instrument choices for the future in Australia, but also the future instrument choices of other carbon intensive countries.

1.1 Research aims

The primary purpose of this study is to examine the influences of both 'soft' and 'hard' instruments on reducing GHG emissions. A special focus is placed on Australia's greenhouse policy from 1997 to 2007. This study has a number of inter-related aims. The first methodological aim is to develop methods for identifying the influence of 'soft' and 'hard' instruments on the reduction of GHG emissions. In doing so, this thesis will clarify which aspects of these methods should be addressed in order to examine the influence in the context of climate change policy and will examine how they should be developed by the most relevant disciplines to reduce GHG emissions.

The second instrument analysis aim is to determine the relative influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed under the first aim. In order to achieve this second aim, greenhouse policy in Australia during 1997-2007 under the conservative Howard Coalition Government is discussed in considerable detail, recognising that the Australian government emphasised largely voluntary-based instruments in response to global GHG mitigating activities, while simultaneously increasing national emission trends and continuing not to ratify the Kyoto Protocol.

In this empirical case study, two aspects are examined by the method developed. The first aspect is to assess how the Australian government allocated their adoption of 'soft' and 'hard' instruments during the period in order to reduce GHG emissions. The second aspect of the case studies addresses the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions. These aspects in the case studies provide useful empirical data for determining the relative effectiveness of 'soft' and 'hard' instruments 1997-2007, and allow for some more general conclusions to be reached regarding the influences of 'soft' and 'hard' instruments on reducing GHG emissions.

1.2 Arguments

This thesis argues that the government has tended to use more mixed instruments in its climate policy, resulting in a situation where policy makers cannot easily address or distinguish the actual class of coerciveness[2], which is also described as a form of instrumental power relations between 'soft' and 'hard' instruments. This thesis also argues that 'soft' instruments largely dominated in Australia's climate policy during 1997-2007, and hypothesises that they did not encourage the reduction of GHG emissions.

Research here firstly indicates that large numbers of policy instruments used during 1997-2007 were mixed instruments[3]. An analysis employing the six instrument categories[4] is used to illustrate the types of instruments but not their level of relative dominance (i.e. 'soft' and 'hard'). The study also finds that not only does the government uses more mixed instruments in climate policy but that policy makers cannot easily recognise which instruments are 'soft' or 'hard' regarding clear instrument characteristics and their effectiveness. In other words, policy makers can fail to recognise that voluntary measures are not always 'soft' instruments, and that regulations are not always 'hard' instruments, depending on the class of instrument

[2] The actual class of instrument coerciveness/ power relations is regarded in this thesis as the level of social control by instrument uses by governments. Policy instruments are a package of techniques under the power of government authorities to ensure support and to effect social change. Policy will not work appropriately if a government does not utilise its power with respect to policy instruments in terms of social achievement (Bemelmans-Videc et al. 1998: 1-21). Furthermore, policy instruments reveal a theorisation of relationships between the governing and the governed. Every instrument involves a form of knowledge about social control and ways of practising it. Policy instruments thus mean a form of power (Halpern et al. 2008). Given this, the understanding of 'soft' and 'hard' instruments reveals the actual class of instrument coerciveness/ power relations: the level of social control by instrument uses by governments.

[3] Mixed instruments indicate that a policy activity is classified as a selecting multiple instrument choice. This categorises a policy program as a mixed approach and is not counted within more precise categories by the other five instruments which were described above. In the Australian national reports (AGO 2002 and 2005a), mixed instruments are referred to as various instruments.

[4] Six instrument categories are regulatory, voluntary/voluntary agreement, economic, research, information-based and mixed instruments

coerciveness/ power relations; namely, government intervention, regulation/legal binding instruments, and penalties, which is examined here.

This thesis also demonstrates that Australian climate policy initiatives 1997-2007 largely reliant on relatively soft instruments, were an increasing trend over time. Most of the instruments used in this period were also designed without strong articulation with government intervention, regulation[5], and penalties. Moreover, there was a strong preference by government for focusing on incentive-based, information-based and auditing based approaches (i.e. information, education, incentives, guidelines and auditing). In terms of the effectiveness of instruments, although the overall emission trends showed the country increased emissions over the period, the few 'hard' instruments employed were relatively more effective than the 'soft' instruments in reducing GHG emissions in the country. This research also shows that the policy design based on voluntary-based instruments during 1997-2007 did not encourage a significant reduction of GHG emissions. Although 'hard' instruments in Australia seem to be more effective than 'soft' instruments, the influences of 'soft' and 'hard' instruments more generally vary in other countries depending on their circumstances.

1.3 Significance

This study is significant for a number of reasons. First, it contributes to an examination of coerciveness in policy instruments. This better enables policy makers to classify various policies and their impacts (Okinomous and Jepma 2007), to determine the actual class of coerciveness and to clearly interpret effectiveness (Macdonald 2001). However, causality between policies and outcomes is often unclear, particularly where mixed or varied instruments are applied for a policy design (Sullivan and Wyndham 2001). Too much focus on mixed instruments (more than one instrument combined) also results in complicated combinations and difficulty for classification (Okinomous and Jepma 2007), since an optimal mix (Howlett 2004) has become accepted as an effective policy instrument design in common thinking (Van Nispen and Ringeling 1998; Gunningham, Grabosky, and

[5] Regulation in this thesis is also referred to as legal binding.

Sinclair 1998; and Howlett 2003, 2004). When analysing instrument mixes, researchers have however neglected to recognise the absolute power relations between 'soft' and 'hard' instruments as discussed above. Therefore, there is a need for further development of methods to classify the degree of 'softness' and 'hardness' of policy instruments with an illustration of their effectiveness. This study contributes to development of the field of public policy with respect to climate change.

This study is also significant because an understanding of 'soft' and 'hard' instruments represents a manner of appreciating governmental control by instrument choice (Hatch 2005). The balance of power between coercive and non-coercive instrument type is essential in relation to reducing GHG emissions (Edenhofer et al. 2009). A clear identification of the influences of 'soft' and 'hard' instruments thus helps to address the extent of governmental control during a certain period of time, and to identify strengths and weaknesses of instrument design by government in terms of urgent action in order to reduce GHG emissions. This study is for instrument analysis theory as it also allows policy makers to develop ideas for further discussion about the most appropriate climate change policy.

The third reason that this study is significant is that a study on Australia's climate change policy is critical, Australia being one of the most carbon intensive countries in the world. When the rest of the world was demanding strong initiatives from developed nations to immediately implement actions to reduce greenhouse gases, Australia was taking predominantly voluntary action in this regard. This thesis will critically reflect on case study material in order to demonstrate how the 'soft' and 'hard' instruments adopted by the government influenced reduction of GHGs from 1997-2007. This thesis is the first study to explore the design and effectiveness of 'soft' and 'hard' instruments in Australia, but will also generate results, which may allow other countries to develop methods for identifying the influence of 'soft' and 'hard' instruments in the reduction of GHG emissions elsewhere.

1.4 Research design and method

In the literature review, this thesis addresses theoretical understandings of policy instruments, and subsequently considers approaches to, and critiques of, 'soft' and 'hard' instruments, in climate change policy. This approach provides a unique way of conceptualising and analysing public policy and identifies three aspects of analytic methods for identifying the influences of 'soft' and 'hard' instruments in terms of reducing GHG emissions which need to be developed, namely (i) overcoming the lack of classification of 'soft' and 'hard' climate policy instruments; (ii) overcoming the lack of examination of the trend use[6] of 'soft' and 'hard' instruments; and (iii) overcoming the lack of examination of the effectiveness of 'soft' versus 'hard' instruments. These aspects were the key elements considered when developing the methods adopted in this thesis. The methods used within this thesis are employed for a study of policy instrumentation. There are two major methods developed in this thesis from a consideration of the three aspects identified here, to which we now turn.

The first analytic method [Identification & Trend Analysis/ Method] is developed in order to assess how a nation allocated its adoption of 'soft' and 'hard' instruments for reducing GHG emissions over a certain period, and develops two further aspects (i.e. the classification and examination of trend use). 'Trend use' refers in this thesis to recognition of historical trends in use of policy instruments in climate change policy. The Identification & Trend Analysis/ Methods is derived from the instrumentation approach using 'instrumentalism' (Vedung and van der Doelen 1998) incorporated with 'coercive analysis' (Cushman 1941). In the style of 'Instrumentalism', this thesis classifies climate policy instruments (e.g. regulatory, economic and information based instruments) to evaluate how particular instruments influence their particular circumstances and how decision makers interpret their commitments (Linder et al. 1998). 'Coercive analysis' (regarded as 'degree of coercion'; Doern and Phidd 1992) enables policy makers to illustrate the manner by which policy instrument choice is integrated with the use of coercion by governments (Doern and Phidd 1992), and which reveals the power of government authorities in supporting and effecting social

[6] 'Trend use' refers in this thesis to recognition of historical trends in use of policy instruments in climate change policy.

change with respect to their goals (Bemelmans-Videc et al. 1998: 1-21). This allows this thesis to determine which instruments or programs are 'soft' and 'hard' instruments in the policy domain.

The second analytic method [Effectiveness Analysis/ Method] is developed to examine the effectiveness of 'soft' versus 'hard' climate policy instruments and supports the third aspect of this study which is to develop analytic methods for considering instrument effectiveness. Instrument analysis itself is always a central issue in public policy. However, the study of instrumentation needs to be developed in terms of what the fundamental components essentially demand for instrumentation analysis, in order to interpret policy behaviour (Hood 2007). The study of 'soft' and 'hard' instruments in this thesis has thus emphasised a simple and basic instrument analysis. The main analytic approach adopted is derived from the thinking of Lascoumes and Le Gales (2007). They acknowledge five fundamental approaches that exist as the basis of instrumentation study, namely: a) focusing on instrument analysis as a central issue in public policy and its particular political behaviour for a certain period; b) analysing relevant instrument choice for meeting the policy objectives; c) evaluating the effectiveness of instruments; d) seeking innovative, effective, instruments applicable to particular policy development; and e) focusing on discussing influences of instruments for particular policy network.

It is necessary for an instrumental approach to public policy to have different categorisations for different policy purposes (Hood 2007). Given that, this thesis adds to this fundamental approach by introducing two principles, which can be used for the instrument analysis of climate change policy. The first is *priorities* and the second is *criteria.* Both are required, it is argued, in order to evaluate policy instrument effectiveness for reducing or mitigating GHG emissions. The first principle, *priorities* ensures the most appropriate instruments for climate change policy for the best emission reduction achievement (SYKE et al. 2007), in order to identify specific priorities in the field of policy (Hood 2007). This thesis considered four priorities for climate policy, namely: *instrument design, successful GHG mitigation, program achievement* and *economic efficiency*. These priorities help to analyse instrument design.

The second principle is *criteria*. An examination of the analytic criteria is essential for policy evaluation. There is a need to determine which evaluative criteria are the most suitable for application to environmental policy, in particular to climate change policy (IPCC 2007). This thesis selected four criteria, namely: *effectiveness for reducing GHGs*, *cost effectiveness*, *administrative feasibility* and *political acceptability*. Each criterion measures a different aspect of climate policy, and is required in order to achieve successful GHG mitigation.

Given these thoughts regarding the fundamental approach and the two principles (*priorities and criteria*), this thesis has furthermore synthesised a variety of key aspects into five analytical perspectives: Synthesised Instrument Analysis [SIA], namely: *descriptive perspective*; *transformative perspective*; *analysis of instrument design*; *evaluation of actual effectiveness* and *discussion*. A refinement of this Identification & Trend Analysis/ Methods is to address the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions during a particular period.

In summary, the Identification & Trend Analysis/ Method which identifies the trend use of 'soft' and 'hard' instruments in a climate change policy and the Effectiveness Analysis/ Method which examines how these instruments have influenced the reduction of GHG emissions are developed in this thesis. These analyses allow this thesis to achieve its purpose of examining the influences of both 'soft' and 'hard' instruments on the reduction of GHG emissions.

1.5 Scope and limitations

This research assesses the trend use and examines the effectiveness of climate change policy instruments rather than address policy process or influences of internal and external factors. The scope of this thesis is limited to examining domestic climate change policy in Australia during 1997-2007. However, further study beyond this thesis is needed to examine more cases of 'soft' and 'hard' instruments in other countries in order to more broadly understand the relative effectiveness of these instruments. The effectiveness of 'soft' and 'hard' instruments will very likely be different in different countries. Although the UNFCCC secretariat broadly reviews[7] policy instruments used in contracting countries, a deeper comparison of the effectiveness of 'soft' and 'hard' instruments among different states and countries would also contribute significantly to a global understanding of the ability of 'soft' and 'hard' instruments to reduce GHG emissions, especially in carbon intensive countries.

The usual limitations that affect the instrumentalist methodological approach have been identified here and attempts have been made to improve the relative lack of theoretical analysis. As described above a method derived from 'Instrumentalism' is incorporated here with 'coercive analysis', and a new synthesised Identification & Trend Analysis/ Method developed and incorporated with two principles (*priority* and *criteria*) for examining the effectiveness of 'soft' and 'hard' instruments. This analytic approach is intended to be regarded as a new, all-encompassing theoretical approach for analysis of climate change policy in Australia and potentially other nations.

In addition to the limitation of methods, this thesis emphasises determining the simple classification of 'soft' and 'hard' policy instruments. It focuses on establishing the specific key elements of functional policy activities, such as examining whether a national program is a 'soft' or 'hard' instrument, by looking at a number of key elements such as setting targets and monitoring systems, rather than measuring degrees of carbon reduction targets, reliability of persuasion or regulation/ legal bindingness or the balance between the restriction and cost effectiveness under an instrument. These latter concerns, whilst significant, are not without their own analytic challenges but are beyond the scope of this thesis.

Another limitation of the analysis is the application of instrument categories, based on the instrument category in the UNFCCC guidelines.[8] The data in the *Australian National Communication Report* (2002, and 2005) acknowledged a range of national

[7] The *Complication and synthesis report* reviews detailed information on policies and measures of Parties included in Annex I to the UNFCCC as given in their latest national communications (UNFCCC 2003, and 2007).
[8] UNFCCC [United Nations Framework Convention on Climate Change]. 1999. Review of the Implementation of Commitments and of Other Provisions of the Convention.

initiatives including existing and future programs. However, the definitions of policy instruments under the UNFCCC instrument category are not the same as those proposed by this thesis. The intention of this study was not to categorise all the national initiatives during the period; instead thus this thesis uses selected instrument categories similar to instrument categories from the Australian national communication reports. The other reason for selecting these instrument categories is that there has not yet been a strong move to adopt a clear, simple and formulated categorisation of types of climate policy instruments[9] at the international level, for contracting parties to the UNFCCC to use for their national reports. Indeed different countries have used different instrument categories in such reporting (UNFCCC 2003; and 2007).

Another limitation of this thesis is the difficulty of finding an entire relevant instrument list to be used for data collection, due to limitations in the availability of the data in national reports and inconsistency in the instruments used. The Howard government [1997-2007], provided only three national communication reports, in 1997[10], 2002 and 2005. Each report listed a number of initiatives and described their implementation but some were incomplete and others were never actually implemented during the period. Thus the process of data collection presented some difficulties for this analysis. Although limited interviews were conducted concurrently, by the researcher and meetings were held with several relevant bureaucrats in the federal government, these were for clarification purposes only. These meetings provided useful advice and material, such as additional measures not included in the communication reports up to 2007, to supplement the data collection to some extent.

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[9] The instrument categories used in the national communication reports are based on the 'UNFCCC guidelines on reporting and reviewing', which have been provided by the UNFCCC for Annex I parties. These guidelines suggest what a national communication report should contain, and include illustrations of 'type of policy instrument' (UNFCCC 1999). Although these guidelines show that Annex I parties should describe their instrument types, they do not clearly formulate the categories of according to international standards. Moreover, their suggestions do not apply to all the contracting countries. The *Complication and synthesis report also* describes the difficulty of a review of instrument activities, especially of an classification of instrument types (UNFCCC 2003; and 2007)..

[10] Although this thesis has recognised one of the national communication reports provided by the Howard government [1997-2007], the 1997 report did not include Howard's new National Greenhouse Strategy, which was expected to finalise mid 1998. Thus, the data collection used for the empirical case study is based on national communication reports in 2002 and 2005 to the UN which particularly illustrated the Howard initiatives during his regime between 1997 and 2007.

Another limitation is the focus on the effectiveness of the climate policy 1997-2007. Only the period 1997-2007 is selected for this thesis because the domestic greenhouse policy of this era reflects one of the most critical periods in terms of GHG mitigation policy by one of the most carbon intensive nations. When the rest of the world was demanding strong initiatives from developed nations to immediately implement actions to reduce GHGs, the former Prime Minister, John Howard designed and implemented an individual domestic approach largely dominated by voluntary-based activities, without taking global responsibility as a developed nation for reducing GHG emissions through the first world international agreement on climate change action (i.e. the Kyoto protocol).

The other limitation of the analysis is a consideration of only two key programs as instruments: the Greenhouse Challenge Program [GCP] and the Mandatory Renewable Energy Target [MRET]. The analysis reveals the GCP as a 'soft' instrument, the MRET as a 'hard' instrument. Given this, the MRET was an entirely mandatory framework, a 'hard' instrument. In contrast, the GCP was intended to be a completely voluntary framework, a 'soft' instrument. They were expected to be the most important instruments under national initiatives during the period, and to make a strong contribution to the reduction of GHG emissions over the long term. Thus, a comparative analysis of the effectiveness of the two instruments was a decision which was made in order to evaluate the comparative effectiveness of 'soft' and 'hard' instruments. Although other major critical programs such as Eco-Efficiency Program, Emission Tax and Emission Trading Scheme [ETS] could be used for the analysis, some of them were not implemented over the period, and others were mostly short-term initiatives. Thus, the analysis selected only the GCP and MRET programs.

1.6 Structure

The thesis is divided into eight chapters. Chapter One comprises an introduction, research aims, argument, significance, research design and method, scope and limitations, and the structure of the thesis. The thesis continues as follows here:

Chapter Two introduces the details of the background and significance of this study and the analytical framework by outlining the conceptual development of its 'soft' and 'hard' instrument study. This chapter is divided into three sections in order to address the primary research questions. The first section describes the background and significance of the adopted approach to the major questions of this thesis, by looking at policy instrument literature and 'soft' and 'hard' policy instruments. The second section then presents clues as to what frameworks and principles should be considered in order to provide the most suitable soft and hard policy instrument approach to climate change policy. The third section concludes with the most relevant approach to 'soft' and 'hard' instrument analysis, especially for climate policy. This chapter determines two methods as offering the most relevant approach, which are further discussed in Chapter Three.

Chapter Three develops the two methods identified in Chapter Two. The purpose of the Identification & Trend Analysis/ Method is to classify and identify trend use of soft and hard instruments, illustrating how a government allocates its adoption of 'soft' and 'hard' instruments during the design period of a climate policy. The concept of 'Instrumentalism' is examined, as is 'coercive analyses'. The purpose of the Effectiveness Analysis/ Identification & Trend Analysis/ Methods to examine the effectiveness of 'soft' and 'hard' instruments in a policy which aims to reduce GHG emissions. The synthesised analytical method adopted is based on Lascoume's and Le Gale's (2007) fundamental approach and incorporates two principles for climate change policy, namely *priorities* and *criteria* in order to develop the most appropriate evaluation framework for addressing the relative effectiveness of 'soft' and 'hard' instruments in reducing GHG emissions in this study. The details of the methods in this chapter are critical to subsequent analysis of the thesis empirical studies.

Chapter Four explores the development of Australia's climate change policy. This Chapter establishes the need to consider the effectiveness of the climate change policy in the chosen period of 1997-2007. All developed countries are responsible for leading significant action for reducing GHG emissions. Since the Kyoto Protocol came into force, developed countries have been expected to lead by acting to achieve GHG emission reductions (Taplin 2004). An understanding of the unique circumstances in Australia is necessary, including, the rapid population growth and land use patterns, and the dominance of economic resources by large energy intensive and carbon intensive manufactures and products. However, domestic greenhouse policy of this era reflects one of the most critical periods in terms of GHG mitigation policy by one of the most carbon intensive nations. The Australian government designed and implemented an individual domestic approach largely dominated by voluntary-based activities, without taking global responsibility as a developed nation for reducing GHG under the Kyoto Protocol. These findings were essential for the following case studies in order to address and appreciate background and significance.

Chapter Five turns to present analysis of two empirical case studies. In these studies, two methods are applied, which were developed in Chapter Two and Three, namely: the Identification & Trend Analysis/ Method to classify and identify trend use of soft and hard instruments; and the Effectiveness Analysis/ Method to examine the effectiveness of 'soft' and 'hard' instruments in reducing GHG emissions. The major purpose of this chapter is to demonstrate the Identification & Trend Analysis/ Method, which examines how the Australian government allocated their adoption of 'soft' and 'hard' instruments in terms of reducing GHG emissions during 1997-2007, in order to fulfil the second aim of the overall thesis to determine the influences of 'soft' and 'hard' instruments on the reduction of GHG emissions by following the methods developed in the first aim.

In order to complete its analysis, this chapter considers three themes: a) the types of policy instruments utilised by the Australian government during the period 1997-2007; b) how such instruments varied according to the criteria developed in this thesis for assessing 'hard' and 'soft' policy instruments and c) what the trend usage was of such instruments was over time. This chapter illustrates how the Australian government allocated its adoption of 'soft' and 'hard' instruments during 1997-2007 to design climate change policy for reducing GHG emissions. The findings of this chapter were essential for the following case studies in order to identify whether a climate program is 'soft' or 'hard'. This helps with the selection of particular case studies of both 'soft' and 'hard' instruments in order to demonstrate the Effectiveness Analysis/ Method for examining the effectiveness of 'soft' and 'hard' instruments in a policy which aims to reduce GHG emissions..

Chapter Six further demonstrates the application of the Effectiveness Analysis/ Method for the identification of the effectiveness of 'soft' and 'hard' instruments in reducing GHGs during the given period. Then two case studies are selected from the results in Chapter Five: The MRET is identified as a 'hard' instrument and the GCP as a 'soft' instrument. In terms of making an examination of the effectiveness of each program, five analytical perspectives of the SIA method are considered in each case study: a) the *descriptive perspective*; b) the *transformative perspective*; c) *analysis of instrument design*; d) *evaluation of actual effectiveness*; e) and *discussion.* The results in this chapter allow this thesis to conduct a further discussion on the relative effectiveness of 'soft' and 'hard' climate policy instruments.

Chapter Seven continues the case study examination regarding the effectiveness of 'soft' and 'hard' instruments and conducts a further discussion on the results from the SIA Identification & Trend Analysis/ Method identified in Chapter Six. It then concludes with findings on the relative effectiveness of 'soft' and 'hard' instruments in the case of Australia's Greenhouse policy during 1997-2007 in terms of the two key instruments employed. Chapter Seven also draws together and develops the arguments of main importance to this thesis. These discussions in Chapter Seven lead this thesis to its conclusions.

Chapter Eight, as a conclusion of this thesis, returns to assess the primary research question outlined in this introduction in terms of the empirical research detailed in the preceding chapters, namely: to develop methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions; and to determine the influences of these instruments by following the methods developed. It also illustrates and supports the thesis arguments and significance of examining the influences of both 'soft' and 'hard' instruments on the reduction of GHG emissions and provides a special focus on Australia's climate policy during 1997-2007.

1.7 Conclusion

This introduction has provided some background to the study that follows, and outlined its essential aims, scope and limitations. The chapter has also outlined the core arguments and structure of this thesis. The following chapter introduces the details of the background and significance of this study, and its analytical framework by outlining the conceptual development of its 'soft' and 'hard' instrument study.

Chapter Two
Literature Review

2.0 Introduction

The current chapter presents the details of the background and significance of this study and the analytical framework, by outlining the conceptual development of the 'soft' and 'hard' instrument study. This also clarifies which aspects of methods should be addressed in order to examine influence in the context of climate change policy and gives a clear picture of fundamental analytical frameworks in this study. This chapter fulfils the first aim of this thesis which is to develop methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions.

Three themes are considered in this literature review: a) introducing the details of the background and significance of this study and the analytical framework by outlining the conceptual development of the 'soft' and 'hard' instrument study; b) addressing policy instrument theory, with a subsequent focus on approaches to, and critiques of, 'soft' and 'hard' instrument theory; c) and establishing the most relevant approach to answer the methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions.

The results of this chapter reveal three aspects in terms of developing methods for identifying the influences of 'soft' and 'hard' instruments, namely (i) overcoming the lack of their classification; (ii) overcoming the lack of examination of their trend use; and (iii) overcoming the lack of examination of the effectiveness of 'soft' versus 'hard' instruments. In considering these three aspects, two major analytical methods are developed for adoption in this thesis.

The first analytic method [Identification & Trend Analysis/ Method] is to identify trend use of 'soft' and 'hard' climate policy instruments. This method assesses how a nation allocated its adoption of 'soft' and 'hard' instruments for reducing GHG emissions over a certain period. The second analytic method [Effectiveness Analysis/ Identification & Trend Analysis/ Methods] is used to examine the effectiveness of 'soft' versus 'hard' instruments in the policy, in order to analyse relative effectiveness. The framework with the two methods adopted in this chapter and throughout the thesis is fundamentally located within a 'soft' and 'hard' policy analysis framework, something which remains underdeveloped within policy instrument studies more generally. Further development of 'soft' and 'hard' instrument analysis, such as is undertaken here, will potentially help to present a clearer picture of instrument design and its effectiveness, more broadly, in response to GHG emission reduction.

This chapter concludes that Identification & Trend Analysis/ Method will be derived from the instrumentation approach using 'instrumentalism' incorporated with 'coercive analyses', which will be further explored in the following chapter. In terms of the Effectiveness Analysis/ Method, this thesis adopts its own Synthesised Instrument Analysis [SIA] approach, as the most fundamental and relevant method for evaluating the effectiveness of the 'soft' and 'hard' instruments. The further details of SIA will be described in the following chapter.

The remainder of the chapter is divided into three sections. Firstly, it presents the background and significance of this study and its analytical framework by outlining the conceptual development of the 'soft' and 'hard' instrument study, and by looking at policy instrument literature and 'soft' and 'hard' policy instruments. A look at policy instrument literature confirms the importance of the contribution this thesis makes, and of what should be achieved throughout this study. The second section then presents clues as to what analytical frameworks and principles should be considered in order to provide the most suitable 'soft' and 'hard' policy instrument approach to climate change policy. Finally, the chapter concludes with the most relevant approach to 'soft' and 'hard' instrument analysis, regarding the policy.

2.1 Section One: Background and Significance of 'Soft' and 'Hard' Instruments

2.1.1 Policy instrument literature

The following section will describe the background and significances of this thesis, by looking at policy instrument literature, and 'soft' and 'hard' policy instruments. In the first part, policy instrument analysis, historical context and approaches, and importance of the study of policy instruments will be explored. These aspects are very important in terms of understanding the relevant contexts of the field of instrument study and analysis. In the second part, soft and hard instruments, policy instrument transformation, and significance of soft and hard instruments will be discussed. 'Soft' and 'hard' instrument analysis is an underdeveloped, but potentially rewarding, way of viewing the categorisation and usage of climate change policy instruments. The section will conclude by describing the background and significance of the adopted approach to the major questions of this thesis.

2.1.1.1. Policy instruments

Policy instruments are a critical component in the field of public policy. In a policy action, governments affect affairs in society by using various policy instruments as tools. If the consequences are the ends of the policy process, policy instruments represent the influence of means, programs, staffing, budgets, organisations, campaigns and laws' on policy decisions. Moreover, all instruments contain strengths and weaknesses (Howlett 1991). Professional judgment by decision makers and authorities in the government must determine whether an instrument is appropriate or not, in considering ends as well as means. 'Policy goals are often defined in terms of the available means', and if the goals do not show clear direction and a realistic solution, it would be hard to meet their measures and could fail (Majone 1989). Furthermore, policy objectives are frequently defined only as deliberately symbolic; however, instrument choice is also delivered within the context of political and ideological concerns (Bemelmans-Videc et al. 1998).

Thus, policy instruments are a critical element in the field of public policy. Policy instruments are not only government tools for policy achievements but also the means of setting the process in action. The instrument choices are also required to be conducted by appropriate policy actors under the government authority, and need to be carefully discussed in terms of the political circumstances and ideological concerns. The following section will present the historical context of policy instrument study.

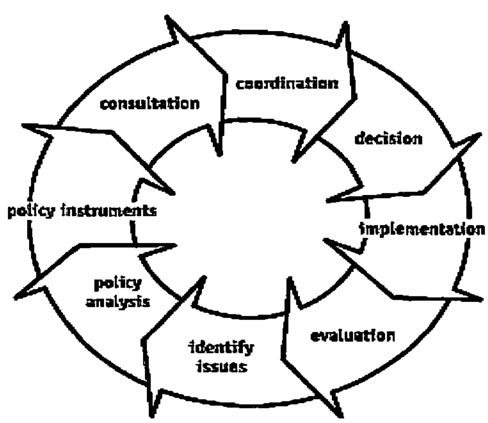
2.1.1.2 Historical context and approaches

Policy scientists have developed studies on policy instruments in order to improve public policy decision-making process. Other policy analysts, notably economists, have researched choosing the right policy instruments, using an approach focused on broad economic efficiency and 'social welfare' considerations. However, most tend to believe that there is not 'theoretical purity' concerning inputs but a response to all social, political, economic, and administrative concerns (Howlett et al. 2003). A number of models have also aimed at finding 'general' theories in the sense of action being limited by particular circumstances to national territories or states on policy instrument study, and since their different values in different countries have been identifying as 'nation-bound' (Howlett et al. 2003). A range of different schemes identifying various types of instrument choice by many political scientists in different countries have been identified in Canadian research (Doern et al. 1983), American research (Salamon 1981; Linder and Peters 1989), and British research (Dunsire 1977; Hood 1986; Maynth 1975) associated with the original ideas of policy instrument choices from American researchers, Lowi (1966) and Charles Anderson (1971). These represent the broad historical contexts and approaches in policy instrument studies. The following section will describe the importance of the study of policy instruments, and will confirm the importance of instrument studies to the field of public policy.

2.1.1.3 Importance of the study of policy instruments

Three important elements of studying policy instruments in the field of public policy can be identified. Such study examines the: critical components of good policy; means of social goals; and understanding of historical policy change.

Policy instruments are key components of good policy. Policy is a dynamic rather than a static process, so that good process can assist good policy. A policy cycle can help to identify the basic steps any policy must complete in idealised fashion as it evolves from an idea to an instituted program (Davis et al. 1992). Bridgman and Davis (1998) for example describe an eight phase policy cycle starting with 'identify issues' to 'policy analysis', 'policy instruments' 'consultation', 'coordination', decision', 'implementation', and 'evaluation'.



Adapted from Bridgman, P. and G. Davis. 2004. *Australian Policy Handbook 3rd edition.* Sydney: Allen & Unwin.

As shown, policy instruments are positioned in the process after 'identify issues' and 'policy analysis', as significant components. Policy analysts must identify appropriate instruments[11]. Some issues require legislation, others require modification of the activities of government agencies (Bridgman et al. 2004). Further processes in 'consultation', 'coordination', and 'decision' concern the choice of policy instruments, by which government targets its policy objectives, so that policy instruments can be enforceable, effective and educative (Carter 2001). 'Implementation' then ensures

[11]e.g. 'advocacy', 'government action', 'funding' and 'legislation' adapted from Bridgman, P. and G. Davis. 1998

policies become practice (Howlett 1995). 'Evaluation' judges the effectiveness of a policy and starts the cycle afresh by looking again at the issue and available instruments (Bridgman et al. 2004). Therefore, policy instruments are the critical components within the process for a good policy.

Understanding of policy instruments is important to achieve social goals. Policy instruments are a package of techniques under the power of government authorities to ensure support and effect social change to their goals. "The discourse on public policy instruments is a discourse on political 'power'. Central government is drawn as 'a mediator between interests', 'a client-oriented manager', 'responsive' and 'consultative' to all appropriate actors and stakeholders" (Bemelmans-Videc et al. 1998: 1-21). Thus, policy will not work appropriately if a government does not utilise its power with policy instruments to lead the public into social achievement (Bemelmans-Videc et al. 1998: 1-21). Policy instruments are interventions by public authorities, which interpret and implement clear actions (Vedung and van der Doelen 1998). Policy instrument choice reflects basic political or administrative action as reflected in general aims and the means of action. There are certain types and degrees of intervention: 'from reserved, cautious, minimalistic and subsidiary intervention, and from repressive forms of intervention to preventive action, implying the creation of conditions that favour preferred behaviour'. Thus instruments represent the way of leading actions to social targets (Vedung and van der Doelen 1998). Therefore, understanding policy instruments means understanding governmental power, and its various interventions, toward social goals.

Of other major importance, the study of policy instruments means understanding historical policy change. Instrument activities such as instrument choices and their effectiveness cannot be done without a government. Furthermore, instrument activities by a government do not only represent government power but also political behaviours and manners in a certain period of time and cannot be generalised in any activities or situations (Hood 2007), and have to meet the demands of particular situations (Linders et al. 1989). Further, policy instrument and implementation approaches specifically point to a stronger focus on the procedural concept of policy centralised on the idea of establishing instruments. This enables the policy actors involved to take responsibility for defining policy targets (Lascoumes et al. 2007). It is acknowledged as essential to accepting alternative instrument selection for political decision making for a particular issue for a particular place (Bemelmans-Videc et al. 1998) These show that policy instrument study is important to understand historical policy change.

It is therefore important to pursue the study of policy instruments because the study can investigate: a critical part of policy processes for a good policy, means of social goals; and understanding historical policy change.

2.1.1.4 Summary

The background and significance of the major questions of this thesis are firmly positioned within the overarching context of policy instrument analysis in public policy. This part of the chapter suggests that policy instrument study is a critical part of the field of public policy. Furthermore, policy instruments are essentially a means and ends matter, that is recognised as a central issue in public policy and policy management. This section has found that policy instrument study is very important because instruments and the conceptualisation of policy in a means and ends fashion are critical to good policy process; a means to achieving social goals; and a way to understand historical policy change.

2.1.2 'Soft' and 'hard' policy instruments

This thesis points out the need to develop policy instrument studies, in particular the study of 'soft' and 'hard' policy instruments. The following section will now present background and significance found in the field of 'soft' and 'hard' instrument studies. This section will describe the reasons why this thesis will attempt to further develop a study of 'soft' and 'hard' instruments, especially in climate change policy. It will then explain the significance of the adopted approach to the major questions of this thesis.

2.1.2.1 'Soft' and 'hard' instruments

The study of 'soft' and 'hard' instruments has questioned the demand for availability, variability and productivity of these tools for a long time, especially when analysts started to question the relationships and influences of the characteristics of each instrument and individual instrument effectiveness; for example, any links between regulatory, economic and information instruments (Vedung and van der Doelen 1998). Various expressions used to represent 'soft' and 'hard' instruments can be found in the policy instrument literature, including: 'deregulation and regulation' (Gunningham et al 1998), 'coercive' and 'less coercive' or 'non-coercive' (Cushman 1941; Hood 1986; Doern and Phidd 1983), or 'voluntary, mandatory' or 'compulsory' (Anderson 1977; Howlett, 2004).

Hatch (2005) summarised the relationships between 'soft' and 'hard' classification and policy instrument activities when he said that the 'most fundamental and salient distinction' found in policy instrument activity is dominated by two streams: 'mandated and voluntary'. Mandated actions are based upon legal sanctions. On the other hand, voluntary actions are often nonbinding and have more flexibility. However, in a particular policy context such as environmental policy, recognition of the classification often becomes more complicated. Furthermore, the definition of 'soft' and 'hard' classification cannot be simply defined and effectiveness still remains a huge uncertainty. Scientists often accept three main types of instruments: regulatory, economic and information-based. They frequently describe regulatory instruments as the most traditional and strongest instruments in instrument literature. Furthermore, information or economic instruments are often recognised as weaker instruments (Vedung et al 1998; Howlett 2004). However, the background discussion still questions: what are the relationships are between `soft` and `hard` instruments classification, and individual instruments (e.g. regulatory, economic and information-based). Answering this, the following section will examine preconceptions of 'soft' and 'hard' classification and the transformation of policy instruments in an historical policy context.

2.1.2.2 Policy instrument transformation

In the public policy instrument literature, 'soft' and 'hard' instrument classification between each policy instrument have been considered to enable better instrument selections in different circumstances over time. Howlett (2004) concluded that three instrument generations dominated in the literature, namely: restricted by 'regulatory' actions (first generation); modified with softer instruments by 'deregulatory' actions (second generation), and the pursuit of a more comprehensive combination between 'soft' and 'hard' (third generation). The following section reviews the historical changes in 'soft' and 'hard' instrument classification.

In the early years of policy instrument research, recognised as the first generation, economists largely studied business-government relations, as well as the influences of regulation and economic policy on business efficiency. Despite the dispute between 'neo-classical' and 'welfare' economists over the concept, economists tended to focus on 'market failures' in the short term (Howlett 2004). Policy analysts also neglected to strike a balance with economic implications but interacted with rational instrumental choice in a political sense (Salamon 1981; Balch 1980). After these, most 'neo-classical' literary accounts focus on governing instruments that became inefficient due to unbalanced decisions regarding production and consumption in the marketplace. This brought about a preference for direct control of public goods through government power (Wolf 1988). On the other hand, policy analysts also questioned the domination of governments and recommended switching to softer instruments (Hood 1986).

In the second generation, studies of 'instrument choice' also focused on the concepts of instrument selection and instrument combination as a basis for 'regulation and deregulation' (Van Nidepen et al. 1998; de Bruijn et al. 1998; Bressers et al. 1998). This resulted in more demand for a combination of strong government intervention and less stress on the public (Wood 2004). During times of change, regulatory instruments dominated at first, however, because of too much focus on governmental power, there was more demand for softer instruments.

In the third generation, instrument study of a combination with 'soft' and 'hard' instruments, a so called 'optimal mix', became more common (Howlett 2004); for instance, 'marketable instruments, regulatory and deregulatory' actions (Grabosky 1994; Gunningham and Yong 1997), due to achieving policy goals as well as cost effectiveness (Wood et al 2004). Some studies introduce a more sophisticated mix of instrument choice based on 'smarter regulations', which has been developed out of the necessity for instrument selectivity as well as to mix with a number of market solutions and public and private demands, especially in the field of environmental policy (Gunningham et al 1998). More recent instrument study thus demands more mixed instrument uses combined with 'soft' and 'hard' instrument classification.

The historical background described strong connections between 'soft' and 'hard' instrument classification and showed that the demands of instrument activities changed over time. This also suggested the classification is dependent on the level of governmental power, stress on the public and government intervention. However, practical applications require more individual attention. The following section will further examine how the 'soft' and 'hard' classification exists in a particular policy context, especially in environmental policy.

2.1.2.2.1 'Soft' and 'hard' instrument classification in Environmental Policy

In practical terms, in the field of environmental policy, much emphasis was placed on using regulatory instruments (harder instruments), so called 'command and control'. However, these tools became much less common in the 1970s when the focus shifted to utilising more market-based instruments, such as 'polluter pays', and damage compensation. In recent years, more 'soft' instruments have become more popular in the environmental policy context with a wide variety of instruments, however, such as voluntary agreements, eco-labels, information campaigns and green public strategies (Gunningham et al 1998). Moreover, a critical issue for environmental policy is the need to ensure a balance of the instrument activity between the international and domestic contexts in terms of the global achievements (Stavins 1997). A number of studies have been undertaken to develop methods of theoretical analysis to measure the effectiveness and efficiency of a variety of instruments for environmental policy;

however these tended to be very complicated (OECD 2001; Jordan et al. 2003; Sterner 2003).

In this light, although studies of instrument choice, 'soft' and 'hard' classification have been considered over time, there are now demands for more mixed, comprehensive solutions using a full range of financially, legally, and socially effective instruments, depending on policy focuses. In practical terms, environmental policy not only places more emphasis on simple economic devices and optimal interactions with voluntary approaches using a number of different instruments, but also gives more consideration to global solutions with both domestic and international implications.

Given this, the classification of 'soft' and 'hard' instruments cannot be simply defined, but always exist in policy instrument activity. Understanding the influences of 'soft' and 'hard' classification is very important in terms of identifying the manner of government power for achieving a particular policy target, but identifying the level of governmental power becomes more complicated, once multiple elements are required for an approach such as the demands for the international and domestic contexts. There is a need for the further development of 'soft' and 'hard' instrument analysis, which is urgently required in the field of climate change policy. The following section will describe why this thesis focuses on analysing 'soft' and 'hard' instruments in the policy.

2.1.2.3 'Soft' and 'hard' instrument analysis

Instrument analysis itself is evidently one of the most important issues for public policy and management (Hood 2007), and evaluating instrument effectiveness is a basis for analysis (Lascoumes et al 2007). However, it tends to involve more comprehensive methods used, which result in more complicated solutions such as too much focus on political issues or external factors. Specifically, environmental policy analysis requires indication of 'success and failure' factors by examining instrument effectiveness with empirical case studies that can assist in delivering sustained improvements in critical environmental issues (Bailey, I 2008; Krarup, S. 2001; Folmer et al. 2001).

As identified in Chapter One, this thesis will conduct a case study on climate change policy to reduce greenhouse gases [GHGs] for the Australian national context. This is because, in order to achieve the policy outcomes at a global level, reducing greenhouse gas emissions cannot be ignored and a global solution must be found on both international and domestic levels (Stavins 1997). If each nation achieves its goals in terms of reduced emissions, this will lead to global outcomes. On a domestic scale, industry and the public are the main actors who actually bring about the reduction outcome; however, nothing will occur if government is not prepared to lead the nation (OECD 2004). It has been largely accepted that greater 'ex post' empirical evaluation of instrument effectiveness with various instrument uses on national level activities for environmental policy, is essential but greatly neglected (Hatch 2005).

With particular emphasis on 'soft' and 'hard' policy instrument analysis in the context of climate change policy, understanding of 'mandatory and voluntary', namely 'soft' and 'hard' instruments, represents a manner of governmental control by instrument choice (Hatch 2005). A mandatory instrument in the policy often fails in its achievements but the balance of the power with other instruments is essential in terms of reducing GHGs (Edenhofer et al. 2009). A clear identification of the influences of 'soft' and 'hard' instruments will thus help to address a manner of governmental control during a certain period of time, in terms of being required for urgent action in order to reduce GHG emissions (IPCC 2007b).

2.1.2.4 Significance of 'soft' and 'hard' instrument approaches

There is a demand for identification of the influence of 'soft' and 'hard' instruments in the field of public policy, in particular, of climate change policy. While such research on mandatory and voluntary actions has largely been accepted as a major approach to policy instrument analysis, lack of this approach still exists in 'soft' and 'hard' instrument analysis theory in terms of considering the examination of how soft' and 'hard' instruments bear influence in the context of the policy: in terms of –

- Lack of classification of 'soft' and 'hard' instruments
- Lack of examination of the trends in use of 'soft' and 'hard' instruments
- Lack of examination of the effectiveness between 'soft' and 'hard' instruments

First, there is a lack of classification of 'soft' and 'hard' instruments. Although modern instruments have been relatively mixed with many alternative combinations of instruments due to the complex political and practical issues arising from the need to satisfy historical demand (Van Nispen and Ringeling 1998; Gunningham et al 1998; Howlett 2003, 2004), it was believed that 'optimal mix' would be a better solution, in meeting a particular circumstance such as environmental (Gunningham et al 1998), and climate policy (Stavins, 1997; Jordan et al, 2000; OECD, 2001; Okinomous and Jepma 2007; and IPCC 2007b). However, too much focus on mixed instruments has also resulted in more complicated combinations and more difficulty in classification (Okinomous and Jepma 2007). Despite a number of scholars suggesting that such modern uses of mixed instruments can be effective (Van Nispen and Ringeling 1998; Gunningham, Grabosky, and Sinclair 1998; and Howlett 2003, 2004), they have neglected to recognise the actual class of coerciveness between 'soft' and 'hard' instruments when designing instrument mixes. For instance, information or education instruments are generally defined as non-mandated policy; therefore, some researchers rank these instruments in the weakest position. However, these instruments are often integrated with other powerful instruments (i.e. mixed with incentives or regulatory instruments), and thus should be positioned in stronger ranks. Sullivan and Wyndham (2001) acknowledge that identification or interpretation of environmental effectiveness in different ways and to solve a problem, for example whether the policy targets achieved or failed in 'a comparative sense', is often problematic. Moreover, 'causality between policies and outcomes' is often unclear, in particular, where mixed or various instruments (more than one instrument combined) are applied, thus necessitating improvement in terms of unclear class of instrument coerciveness and the illustration of instrument effectiveness into something simpler and clearer to distinguish.

A clear illustration of the level of the instrument coerciveness includes a combination (mixed), and individual selection (applying only one instrument for a particular target), which is necessary to examine the clear effectiveness of instrument uses (Vedung et al 1998). Furthermore, researchers often acknowledge that a variety of instrument mixes have the potential for successful delivery in their own right and can guide their own direction toward targets including financially, legally and socially effective perspectives (De Bruijn and Hunfen 1998; Van Nispen and Ringeling 1998; Bressers and O'Toole 1998). This may also be true for 'optimal' instrument mixes associated with a sound combination of a number of public and private demands and market solutions resulting in better delivery with the most comprehensive methods (Grabosky 1994; and Gunningham et al. 1997). However, this theory strongly emphasises Hatch's statement that all instruments contain a certain level of coerciveness and are based on two individual streams: 'mandated and voluntary'. In this sense, mixed instruments do not therefore exist independently, but should be positioned based on their level of coercion, depending on the degree of 'soft' and 'hard' instrument use. Therefore, there is a need for further development of classifying the degree of 'soft' and 'hard' instruments in the study of policy instruments.

Secondly, there is a need for a method to evaluate the trend use of 'soft' and 'hard' instruments. The absence of public understanding of the direct and indirect influence of government power arises from the need to estimate the distribution and allocation of resources to particular policy targets and provide the results to the public. It is essential to examine how governments allocate their instruments during certain periods of time in terms of: preparing better decisions; making improvements; and understanding the 'nature' and 'types' of the political circumstance of governing resources and management tools (Lasswell 1958). The importance of instrument choice ('statecraft') represents an effective evolutionary function of the process of resolution for problems in the policy implementation (Howlett et al. 2003). Analysis of government designed policy instruments over a certain period of time reveals the nature of government tools and their strategy (Balch 1980). Moreover, the most important analysis of the impact of regulation should consider the actual effect of the distribution and allocation of resources to their intended goals (Hartle 1979). This suggests that there is a need to develop a method for examining the trend use of 'soft' and 'hard' instruments, incorporated with the classification of 'soft' and 'hard' instruments.

Thirdly, there is a need to assess the effectiveness of 'soft' and 'hard' instruments. In terms of 'soft' and 'hard' instruments, Macdonald (2001) argues that instrument analysis has been largely concerned with the relations of coerciveness or non-coerciveness and effective use. However there is a need to further develop methods to address the actual impacts of instrument activities, in terms of implementation and enforcement to determine the actual class of coerciveness and its clear interpretation of effectiveness. Hatch (2005) further stated that observing 'soft' and 'hard' instrument effectiveness over a certain period of time will contribute to better instrument analysis; although he also concluded that there is no single clue for judging best instrument use. Empirical evaluation of various instrument uses requires a critical recognition of 'success and failure' which can provide sustained developments in environmental performance and changes (Krarup 2001). However, the simple and clear demonstration of the relationship between 'soft' and 'hard' instrument ideology is still yet to be determined as is its effectiveness, especially in estimating goal achievements. Moreover, examining individual cases with extreme models of 'soft' and 'hard' instruments in a nation will illustrate the precise effectiveness of 'soft' and 'hard' instruments in particular national circumstances, a theory which still needs to be developed in instrument study, especially to illustrate the preference of a nation for particular instruments (Lascoumes et al. 2007). Given these circumstances, there is a need to identify in summary effectiveness, namely whether the policy instruments achieve their ends or not. There is a critical demand for developing a simple method for examining instrument effectiveness of policy instruments in particular circumstances.

2.1.2.5 Summary

Given these details, this section has identified the lack of approaches by which 'soft' and 'hard' instruments bear influence in the context of climate change policy. More specifically, three significant factors are also addressed:

(i) The lack of classification of 'soft' and 'hard' instruments
(ii) The lack of examination of the trend use of 'soft' and 'hard' instruments
(iii) The lack of examination of the effectiveness of 'soft' versus 'hard' instruments

The following section will summarise the objective of the first section in this chapter.

2.1.3 Summary of Section One

In the first section of this chapter the background and significance of 'soft' and 'hard' policy instrument study was presented. Firstly, policy instrument literature described the background of policy instrument study as well as the relationship between public policy and instrument study. The first part of this section concluded that policy instrument study is critical in the field of public policy, and has been recognised as the central issue of policy achievement. The second part of the section established that 'soft' and 'hard' policy instrument analysis, as an element of policy instrument literature, provides a unique and underdeveloped way of conceptualising and analysing public policy. A major contribution of this thesis is an attempt to develop 'soft' and 'hard' instrument analysis, regarding climate change policy. Such a development has the potential to facilitate (i) the lack of classification of 'soft' and 'hard' instruments; (ii) the lack of examination of the trend use of 'soft' and 'hard' instruments; and (iii) the lack of examination of the effectiveness between 'soft' and 'hard' instruments.

2.2 Section Two: Developing Methods for 'Soft' and 'Hard' Instrument Analysis

The second section of this chapter aims at developing the foundation for an approach to 'soft' and 'hard' instrument analysis, within the context of climate change policy. In the previous section of this chapter, this thesis addressed three elements of instrument analysis for identifying the influences of 'soft' and 'hard' instruments in response to the reduction in GHG emissions which need to be addressed and developed, namely: (a) the lack of classification of 'soft' and 'hard' instruments; (b) the lack of examination of the trend use of 'soft' and 'hard' instruments; and (c) the lack of examination of the effectiveness of 'soft' versus 'hard' instruments. In considering the three elements which have been addressed in order to develop methods, this thesis has selected two analytical methods for further examination, which are the Identification & Trend Analysis/ Method and the Effectiveness Analysis/Method.

The purpose of Identification & Trend Analysis/ Method is to assess how a nation allocated its adoption of 'soft' and 'hard' instruments for reducing GHG emissions over a certain period, which develops the first and second aspects (i.e. the classification and examination of trend use). The purpose of the Effectiveness Analysis/ Identification & Trend Analysis/ Methods used to examine the effectiveness of 'soft' versus 'hard' climate policy instruments and supports the third aspect of this study which is to develop analytic methods for determining instrument effectiveness.

The first part of the second section of this chapter will develop the Identification & Trend Analysis/ Method. This Identification & Trend Analysis/ Method is drawn from a typology of instrumentation approaches, in order to select the most appropriate analysis for identifying the trend use of 'soft' and 'hard' climate policy instruments. Following this, the second part of this section will develop the Effectiveness Analysis/ Method. This involves the refinement of a method that will be based on a fundamental approach to policy instrument analysis, with the incorporation of relevant elements to the policy, as well as program evaluation techniques. Finally, it will conclude with the development of analytical framework for 'soft' and 'hard' instrument analysis, in relation to the context of the policy.

2.2.1 Identification & Trend Analysis/ Method: identify the trend use of 'soft' and 'hard' climate policy instruments

This section aims to develop Identification & Trend Analysis/ Method, which is to assess how a nation allocated its adoption of 'soft' and 'hard' instruments for the reduction in GHG emissions over a certain period. It will address, firstly, what approaches to the study of policy instrumentation currently exist. It will then discuss which approaches can be adopted for the development of a method of identifying trend use of 'soft' and 'hard' instruments in the general context. In the instrumentation approach literature examined here, a range of theoretical analysis can be seen to have developed over the last three decades. Five main frameworks will be identified here as the main historical instrumentation approaches to instrumentation from the literature, namely:

- 'instrumentalism'
- 'contextual and institutional analyses'
- 'coercive analysis'
- 'policy diffusion', 'policy transfer', or 'learning perspectives' and
- 'public choice analysis'.

2.2.1.1 Typology of instrumentation approaches

Firstly, 'instrumentalism' is a more traditional framework for instrumentation analysis. This type of approach is recognised as the 'first generation of instrumentalism' (Vedung and van der Doelen1998). It is concerned with assuming how particular instruments (Howlett 2003), [12] influence their particular circumstances and how decision makers interpret their commitments (Linder et al. 1998). The traditional approach also focuses on analysing 'hierarchy' objectives. The 'goals-means' or rationality is the fundamental factor affecting instrument selection, which also decides instrument 'usability' (Bagchus 1998). Furthermore, policy scientists predominantly attempted to use this instrumentation approach by concentrating on a comprehensive typology of instruments, because every instrument has implementation issues, influence, central activities and sub-processes. However, this approach is frequently criticised for not satisfying the instrumental doctrine because the categories in this typology are mutually exclusive. Another critical point to this approach, is that lawyers tend to prefer more legal tools and economists more market-based tools (Linder et al. 1998). This shows that instrument choices are dependent on who decides.

[12]First generation is individual approach based on 'regulatory', 'economic', or 'information'. Second generation focuses on the alternative combinations. Howlett, M. 2003. *Studying Public Policy: Policy Cycles and Policy Subsystems*. Oxford : Oxford University Press.

More normative concepts in instrumentation approach can be found in the tools that government decision makers have at their disposal (Elmore 1987). These concepts focus on generating plural and comprehensive choices of instruments and take into account the dynamics and unique characteristics of each instrument (Salamon et al 1989). These two elements of instrumentation analysis are used by decision makers to produce a relevant evaluation process for each instrument on particular policy issues. In addition, these two approaches have been considered less 'administrative techniques', but more concerned with rational choice, based on 'goals and means'; and their policy effectiveness in terms of the decision making. Thus, 'normative-instrumentalism' has been recognised as a wrong approach in terms of policy instrument selection by governments (Macdonald et al. 2006). This may be an incomprehensive approach due to the absence of attention to underlying values and norms, and uncertainty of relations between contexts and policy instruments (Vedung and van der Doelen 1998).

Secondly, 'contextual and institutional approach' together with: 'refined instrumentation', 'national policy style', 'policy network' and 'institutionalisation', were also recognised as important factors in instrumentation literature. This type of approach is recognised as the 'second generation of instrumentalism' (Vedung and van der Doelen 1998). The early study by Hood (1986), introduced the 'contingent approach', and asserted that problems exist in policy and politics, which can be identified by the disclosure of relationships between governments and target groups. In terms of instrument selection, he identified some key functions based on legal constraints, political stresses and learning from past experience (Vedung 2005). The contingent approach focuses on contextual perspectives, and can also be categorised as 'refined instrumentation', (Linder and Peters, 1989; De Bruijn and Hufen, 1990) which evolved from instrumentalism and further developed into the differentiated approach (Peters 1998). Moreover, the more contextual instrument approach has several key factors. First, it emphasises the consideration of 'value and norms'. Second, it attempts to form more comprehensive relations 'between contexts and policy instruments' (Vedung and van der Doelen 1998). Third, it analyses instrument choice by identifying 'pushing and pulling', illustrating the relations between policy actors, who will act for their state benefit, rather than between 'goal and means' in the traditional instrumentation approach (De Bruijn et al. 1998). Fourth, it is concerned about only limited alternative instrument choices evaluated by the actors, who will select the appropriate instrument. Fifth, this contextual approach is distinct from the traditional instrumentalism; which provides unlimited alternative choices. Lastly, in order to evaluate instruments, the contextual approach analyses both the effectiveness of policy instruments and the contexts in which the instruments are used (Bagchus 1998). However, a contextual approach is criticised as: lacking consideration of: attitudes; the values and morals of the people that affect instrument uses; the limited involvement of the factors in design, which should not be focused on only the effectiveness of instruments but also their influence (Donaldson 1982); and the tendency for 'unmanageable complexity and oversimplification' that is caused by less attention to the role of the people or the important position of governments (Bagchus 1998).

The 'National policy style' approach (Linder and Peters 1989; Howlett 1991; and Vedung et al 1998) is another type of contextual approach. This approach improved a design comprising contingent approaches, incorporated with additional perspectives such as 'cognitive factors', which are intended to demonstrate instrument performance level. This observes the institutional framework allowing for the organisational culture of implementation of the policy as well as the 'policy community' functions; these issues are strongly related in particular events with their policy contexts (Howlett 1991). This contextual approach has been considered as an appropriate progression but has also given rise to concern with the approach becoming overcomplicated. This suggests the instrumentation approach needs further research in order to better establish the role of policy instrument analysis, by adopting a more simple approach without overcomplication, overdiversification and overcomplexity (Vedung 2005).

The 'Network approach' is another contextual instrument approach. Majone (1976, 1989) argued that the performance of an instrument cannot be assessed using solely the nature of its technical characteristics, since it is dictated by both institutional context and process of instrument selection. The fundamentals of instrument choice thus are: relations of coerciveness between government and target groups; political constraints; and the capacity of decision makers to control the political function. This approach observes the governance structure associated with its implementation process in terms of instrument choice. Bressers and O'Tool's (1998) research also developed a number of assumptions about the nature of networks and outcomes; considering non-governmental actors in regard to instrument selection; and with emphasis on more characteristics of the policy networks, particularly 'cohesion and interconnectedness'.

Another contextual approach is 'policy networks' or 'policy subsystems' theory (e.g. Howlett 2003). Howlett stressed contextual variables as well as an 'optimal policy mix', which he recognised as the 'second generation instruments' [13]. He also distinguished two streams: 'substantive' and 'procedural instruments'. Substantive instruments are designed on the basis of delivery of goods and services in the society as inputs; and procedural instruments to deliver actual substance for network configuration in terms of providing legitimacy. He concluded that both the capacity of the state and the complexity of the policy subsystem decide the selection of the traditional substantive instruments. Procedural instruments have become a fundamental feature of modern governance (Howlett 2003). The legitimacy of the government style is a governmental variable, and observing procedural and substantive instruments will reveal which implementation style each government adopts (Howlett 2000).

Towards the end of the development of instrumentalism and the contextual approach a new theory called 'institutional approach' or 'institutionalisation' emerged (Bagchus 1998). This type of approach is recognised as the 'third generation of instrumentalism' (Vedung and van der Doelen 1998). This framework synthesises a number of contingencies and perspectives and suggests that analysis consider how an instrument is gradually institutionalised into a policy community where a particular instrument may dominate as an appropriate tool (Bagchus 1998). For example, Ringeling, who particularly emphasises the strong ideological image of instrument choice, associated the institutional characteristics of the country, with its culture, its traditions and its 'politico-administrative structure' (2005). The institutional approach can, therefore, be recognised by its consideration of a sophistication of the previous

[13]First generation is individual approach based on 'regulatory', 'economic', or 'information'. Second generation focuses on the alternative combinations. Howlett, Michael. 2003. Studying Public Policy: Policy Cycles and Policy Subsystems. Oxford: Oxford University Press.

approach such as traditional instrumentalism and refined-instrumentalism. These factors are: improving the lack of attention to people, values and morals; measuring levels of behaviour patterns and routines in the members of the policy community; selecting 'appropriate' choices by government in the context of a policy community with strong government intervention rather than in terms of 'optimal fits'. On the contrary, this approach is often criticised as: less relevant to exploring policy instrument contexts; over-focusing on the policy community of the characteristics dominated into particular governance context in each country; and less able to find alternative policy instruments or account for the costs of altering instruments, which can be very high. However, these explanations still have many uncertainties (Bagchus 1998).

Thirdly, a 'degree of coercion' can be identified in early studies on policy instrument choice. A classical feature of public policy is how it attempts to illustrate that the power of actors is based on government. Doern and Phidd designed a model of policy instrument choice integrated with the framework of coercion by governments, which has been used frequently since the end of the 1970s (Howlett 1991). A more recent study on 'degree of coercion' was completed by Vedung (1998). Vedung concluded that governments may prefer to use more coercive tools, which results in a gradual increase in coercive instruments (Howlett 2003). However, these assumptions have often proved to have the opposite consequence, since more coercive bases are used in the first place. This may represent an 'ideological neo-liberal assumption', demanding more flexible choice; which suggests that government intervention into the market is not a productive solution (Macdonald 2001).

Fourthly, 'policy diffusion' (Tews et al. 2003) together with 'policy transfer' and 'learning perspectives' (Fiorino 2001; Jordan et al. 2003), can be categorised as another type of instrumentation in terms of process. These studies emphasise the influence of international developments and defining and exploring the process of instrument choice, incorporated with policy instrument choice. These studies observe politics and dominant international relations as significant and emphasise the particular circumstances for the adoption of similar policy tools in different countries. The most recent study, for instance, was conducted by Tews et al's idea of policy diffusion. This particularly emphasised identifying and analysing the rapid diffusion of soft instruments (i.e. voluntary instruments), based on introducing New Environmental Policy Instruments [NEPI]; its analysis suggested better interpretation and understanding of the impact of policy diffusion (Tews et al. 2003). By contrast, Jordan et al. (2003) argued that the policy diffusion approaches, so far, have not satisfied the question of why decision makers in a particular nation choose certain instruments from their repertoire of policy instruments. However, Macdonald suggests that institutional analysis can demonstrate the paradigm. Ideal institutional theories are distinguishable by two perspectives, namely: the acceptance that NEPIs could be an instrument process of putting new ideas into effect, and national institutional legacies which play a role in the acceptance of instrument choice. However, these can be concluded with two factors: one is the common idea of how implementation produces various outcomes in society with various institutional allocations, and the other is how instruments and ideas can be only compatible with particular institutional adjustments, which have likely been widely accepted (Macdonald et al. 2006).

Finally, 'public choice analysis' can be classified as a policy instrumentation approach. Trebilcock and Hartle (1982) particularly stressed the self-interest of decision makers or politicians and their attempts to maximize their 're-election', in terms of instrument choice. This approach provides direct incentives to groups of specific voters, when announcing policy to the public. Woodside (1986) argued that there was however an unsatisfactory explanation of the benefits of each instrument according to this implementation. Atkinson and Nigol (1989) also note that this approach fails to identify the institutional constraints and the particular policy instrument choice by government. Given these five major approaches in the school of instrumentation thought, these five elements comprise the historical approach to the instrument study and any further development must depart from this original framework. The methods developed in this thesis are also based on these elements.

2.2.1.2 Discussion

With respect to the method for classification and examination of the trend use of 'soft' and 'hard' instruments, this thesis takes into account some key points of significance of the research contribution discussed above. These are: a way to distinguish 'soft' and 'hard' and a way to recognise historical trend use of policy instruments, in particular policy fields and government activities. In order to cover these points, two approaches can be selected from policy instrument literature; 'instrumentalism' and 'coercive analysis'. 'Instrumentalism' can be conceptualised as enabling policy makers to classify which instruments are based on particular policy circumstances such as instrument classification (e.g. regulation, economic, and information instruments). 'Coercive analysis' enables policy makers to determine which are 'soft' and which are 'hard' instruments. Results from the two approaches thus can reflect the situation of the trend use of policy instruments in particular nations and policy fields during a certain period of time. Thus, this thesis will develop a method for classification and examination of the trend use of 'soft' and 'hard' instruments. The detail of the refined approach will be discussed in the next chapter (Chapter Three: Methodology).

2.2.1.4 Summary

The first part of the second section of this chapter attempted to develop Identification & Trend Analysis/ Method, which is to identify the trend use of 'soft' and 'hard' climate policy instruments. More specifically, it examined a typology of instrumentation approaches. The section concluded that the method utilised throughout this thesis will be derived from 'instrumentalism' and 'coercive analysis'. The second part of this section will attempt to identify methods for examining the effectiveness of 'soft' and 'hard' instruments in the policy.

2.2.2 Effectiveness Analysis/ Method: to evaluate effectiveness of 'soft' versus 'hard' instruments in climate policy

This section will attempt to develop the Effectiveness Analysis/ Method for evaluating the actual impacts of the instrument activities on reducing GHG emissions. More specifically, this involves the refinement of a method that will be based on a fundamental approach to policy instrument analysis, with the incorporation of relevant elements to the policy.

2.2.2.1 A fundamental structure

In order to develop a method for evaluating the effectiveness of 'soft' versus 'hard' instruments in climate policy, this thesis has established that there is a critical demand for developing a simple method for examining instrument effectiveness of policy instruments in particular circumstances. Thus, developing Effectiveness Analysis/ Identification & Trend Analysis/ Methods intended to consider a simple and basic instrument analysis.

There is a fundamental approach that can be taken towards evaluating the effectiveness of policy instruments. Hood (2007) suggested that every instrumentation approach is related to a 'generic approach'. This generic approach aims to consider the roots of instrumentation management with what are the most basic and key elements of instrumentation analysis. His further thoughts for the development of instrumentation analysis include: the need for an instrument approach in public policy to be understood by using different categorisations for different purposes to implement policy; an instrumentation approach gives 'pre-conditions' for further instrumentation analysis to be more convincing. Instrument analysis itself is always a central issue in public policy, with its complexities acknowledged by political scientists. According to Hood, the study of instrumentation needs to be developed in terms of what the fundamental components essentially demand for instrumentation analysis. Lascoumes and Le Gales (2007) also emphasise the need to consider the fundamental meaning of instrumentation study in the field of public policy. Given these, instrument analysis itself is always a central issue in public policy. However, the study of instrumentation needs to be developed in terms of what fundamental components are required for instrumentation analysis, in order to interpret policy behaviour.

Although Lascoumes and Le Gales argue that the instrumentation approach of public administrative literature needs to include more social aspects, they still believe that an instrumentation approach should be at the centre of public policy. However, they acknowledge five fundamental approaches that exist as the basis of instrumentation study:

1. Focusing on instrument analysis is a central issue in public policy and represents its particular political behaviour for a certain period.
2. Analysing relevant instrument choice is critical for meeting policy objectives.
3. Evaluating the effectiveness of instruments is also a key concern.
4. Seeking innovative, effective, instruments applicable to particular policy developments is a central aim.
5. Focusing on the influences of instruments for particular policy networks (i.e. country) is a worthwhile effort.

These five fundamental points can be used as an analytic approach for evaluating the effectiveness of 'soft' versus 'hard' instruments in climate policy. Meanwhile, Hood also suggests that any generic approach should consider different principles for different purposes (2007). Furthermore, Lascoumes and Le Gales (2007) acknowledge that, in principle, every instrumentation approach should identify a particular policy target; which is based on policy outcomes, instrument choice, and instrument effectiveness, depending on the particular policy purpose. As discussed before, the purpose of this thesis is to analyse the effectiveness of 'soft' versus 'hard' instruments in relation to the policy. Thus, this thesis needs to examine further key elements for a particular policy target regarding to the policy in terms of the most appropriate instrument analysis.

2.2.2.2 GHG mitigation policy instrument evaluation

The fundamental structure found in the previous section suggests a need to consider principles of instrument analysis applied to climate change policy. This section examines two principles of instrument analysis applied to the policy. The first is *priorities* and the second is *criteria.* Policy actors need to identify specific *priorities* of the field of policy in order to achieve policy outcomes. Appropriate criteria are essentially required to employ the most relevant evaluation for analysing the effectiveness of policy instrumentation. Both are significant in terms of evaluating policy instrument effectiveness for reducing or mitigating GHG emissions. Specific priorities and criteria relevant to climate change policy will be discussed in the following section.

Firstly, the section will examine priorities for evaluating policy instrument effectiveness for GHG mitigation policy. It will then examine evaluating criteria for instrument influence on GHG mitigation. Finally, it will conclude with the basic principles (of priority and criteria) that are needed to properly evaluate the effectiveness for the policy.

2.2.2.2.1 Priority of instrument analysis for GHG mitigation

This section will examine priorities for evaluating policy instrument effectiveness for reducing or mitigating GHG emissions. A basis for instrument analysis requires examination of particular policy circumstances (Hatch 2005), and its principles (Lascoumes et al. 2007). As mentioned previously, this thesis focuses on the effectiveness of instrument activities for the policy. The policy has been globally recognised as urgently needed (Stavins, 1997; Jordan et al, 2000; OECD, 2001; Okinomous and Jepma 2007; IPCC 2007b), and instrument analysis is one of the most essential platforms for the further steps toward implementation (IPCC 2007b). Studies on the policy instruments will become more popular than ever, and are intended here to enable government to optimise the dynamics of a variety of policy instruments (VROM et al. 2005), which verifies influences of policy instruments on the reduction of GHG emissions and also to some extent on energy systems (Neij et al 2006). In addition to these ends, this study needs to ensure the most appropriate instruments for the best emission reduction achievement (SYKE et al. 2007), as well as analysing a particular policy circumstance for instrument analysis; which policy actors need in order to identify specific priorities of the field of policy (Hood 2007). In terms of conducting relevant instrument analysis, this thesis recognises four priorities by which to compare the fundamental principles for GHG mitigation policy. These are:

- Instrument Design
- Successful GHG mitigation (outcome)
- Program Achievements (implementation)
- Economic Efficiency (cost effectiveness)

Instrument design

Instrument design is one of the most important priorities of instrument analysis for GHG mitigation policy. Instrument activities represent government approaches, and the fundamental meaning of 'normative-instrumentalism' has been recognised as an instrument choice by government for a means to an end (Macdonald 2007). Every instrument approach contains a capacity to seek appropriation of instrument choice and design as a central issue. Capacity needs to be understood by using different categorisations for different purposes in terms of policy implementation in the field of public policy (Hood 2007). Analysing instrumentation activities is a basis for consideration by decision makers to produce a relevant evaluation process and prepare for the better challenge for each instrument on particular policy issues (Salamon et al. 1989). Instrument design is a critical priority of policy instrument analysis, in terms of the successful policy activities as well as: of selecting the right choices; targeting a particular goal; and assessing and preparing for the better choices. This suggests that a further priority of instrument analysis can be addressed depending on the targets of instrument approach. In terms of instrument analysis regarding the policy, this thesis argues that successful GHG mitigation would be another priority, which is examined below

Successful GHG mitigation

The second priority is *successful GHG mitigation*. The main concern of the policy instrument effectiveness is to examine the influences of human actions which contribute to increasing greenhouse gas emissions, and achieving specific environmental goals within policy implementation in order to reduce overall emissions (IPCC 2007b). If there is no strong contribution to global mitigation for example, then a policy may have failed, unless we are to be satisfied with lesser changed circumstances. Mitigation could also include changing public behaviour, institutional restructure, or global integration, which could be recognised as related outcomes if not central outcomes. 'Successful GHG mitigation' should therefore be a critical and central point for these particular policy circumstances. Furthermore, a significant criterion of success would include meeting policy goals, as well as achieving adequate policy design (CUSOTA 1995). Program achievement is very important in identifying whether a policy meets its goals. It includes two significant aspects; *direct contribution* and *indirect contribution* (EEA, 1996; Aldy et al., 2003; OECD, 2001), Although, it depends on a different focus on the different targets and some activities do not target direct reduction effects but others do, the impacts of direct reduction should not only become the central solution for reducing GHG emissions, but also targets for indirect reduction for social improvement. Therefore, program achievement with these two aspects will help in understanding the more accurate influence of individual climate policy activities, and will better describe successful GHG mitigation (Konidari 2007). In this sense, the further priorities of the instrument analysis for GHG mitigation policy may depend on whether successful GHG mitigation is brought about by achieving policy programs. This thesis addresses *program achievements* as the third priority, which is examined below.

Program achievements

The third priority is *program achievements*. Policy is a guidance of social targets, and the targets should be achieved through the governance efforts with public implementation between government and its public (Howlett 2003). Promoting a successful program represents an activity of policy implementation in terms of policy outcomes, resulting in meeting policy targets (Vedung 2005). Achieving the reduction of GHG emissions thus depends on achieving policy goals and programs (CUSOTA 1995). In this sense, in devising climate change policy, the reduction of GHG emissions is thus the main policy target, which needs to be addressed and achieved through policy implementation associated with effective public governance. Every single policy program must then at least contribute to reducing greenhouse gas emissions otherwise it has no meaning in terms of what government has designed and committed to with various programs (EEA, 1996; Aldy et al., 2003; OECD, 2001). In terms of the instrument analysis, program achievement is thus one of the key priorities. However, program achievements for the policy with a failure of cost effectiveness should not be accepted in political movements, which are often concerned in a government decision (IPCC 2007b). Therefore, a further priority of the instrument analysis for GHG mitigation policy can be *economic efficiency*, which is examined below.

Economic efficiency (cost effectiveness)

The last priority is *cost effectiveness*. Addressing cost matters is also critical, and should not be isolated from the main factors of policy evaluation for the policy. Identifying critical cost dimensions can help to create alternative approaches for GHG mitigation which are politically acceptable and feasible (PCGCC 2003). In strict terms, the most cost-effective activity means achieving policy goals at the least cost. Cost effectiveness may also include a range of components including: the costs of administration and implementation for the policy as well as indirect costs, such as how the policy makes cost-reducing technological development feasible (IPCC 2007b). Cost effectiveness also means the process of choosing specific goals with affordability (Sterner 2003). Policy implements particular environmental policy targets, and considering cost effectiveness and any estimation of the financial factors involved is one of the critical challenges of political movements, which would also be the ideal approach (Davies et al. 1998). Therefore, cost effectiveness should be considered in instrument analysis.

Given this, this section found four priorities for evaluating policy instrument effectiveness in reducing or mitigating GHG emissions as principles of instrument analysis applied to the policy, namely: i) *instrument design ii*) *successful GHG mitigation* iii) *program achievements* and iv) *economic efficiency*. The following section will further examine the principle of evaluation criteria for instrument influence on GHG mitigation.

2.2.2.2.2 Evaluation criteria for instrument influence on GHG mitigation

This section will examine the evaluating criteria for instrument influence on GHG mitigation. An examination of relevant criteria is essential for policy evaluation.

However, there is no clear guidance as to which evaluative criteria are the most suitable for application to environmental policy, in particular to climate change policy (IPCC 2007b). However, a range of evaluation efforts driven by climate policy demands have been developed and introduced over the last decade (Konidari et al 2007). For example the following: The Governmental Department of the Netherlands (1990) considers cost effectiveness, equity, flexibility, transparency of GHG mitigation policies; the Government of New Zealand (2001) considers economic efficiency, equity, feasibility, environmental integrity and competitiveness (Konidari et al 2007); Philibert and Pershing (2001) consider environmental effectiveness, cost effectiveness, contribution to economic growth and sustainable development and equity on fixed binding, dynamic, non-binding, sectoral targets, policies and measures for climate change mitigation policy. The Intergovernmental Panel on Climate Change (2001, 2007) considers environmental effectiveness, cost effectiveness, distributional equity, and institutional feasibility; Nordhaus and Danish (2003) consider environmental effectiveness, cost effectiveness, distributional considerations, administrative and political feasibility; Jaccard et al. (2007) consider environmental effectiveness, cost effectiveness, administrative feasibility, and political acceptability. The UNEP et al. (2007) emphasise environmental effectiveness and cost effectiveness. Although numerous evaluation methods have been proposed for GHG mitigation policy, this thesis attempts to employ the most critical and simple evaluation criteria for analysing the effectiveness of policy instrumentation as described below.

From a number of the critical elements for GHG mitigation, the following criteria can be identified: 'environmental performance', 'political acceptability', 'cost effectiveness', 'dynamic cost efficiency', 'competitiveness', 'equity', 'flexibility', 'stringency for non-compliance and non-participation' and 'feasibility of implementation'. These will be briefly described in the following section as a means of working towards a determination of effective mitigation instrumentation.

'Environmental performance' aims to identify whether a policy instrument is successful in meeting its goals. Possible sub-criteria can be identified including direct contribution to reducing GHG emissions and indirect effects. These measures can also be accounted for by considering tco2eq, or energy intensity per sector, percentage of reduction of energy consumption, proportion of renewable energy sources and so on

(OECD 2001). 'Political feasibility' shows the level of attitude of involved stakeholders according to the instruments. In the case of national instruments, target groups will be identified such as stakeholders particularly related to policy activity (EEA 1996). 'Cost effectiveness' is classified as achieving individual instrument/policy measure goals within the most financially acceptable and affordable contexts. 'Dynamic cost efficiency' is defined as the function of promoting technological or research development, in terms of innovative technological solutions (Duncan 1999). 'Competitiveness' represents the ability of financial performance to give or motivate benefit from products or services solutions externally and internally (Zhang et al. 2004). 'Equity' is defined as the ecological and administrative fairness of policy instruments in allocating emission rights, and the compliance benefits and costs under individual policy actions for achieving GHG emission reductions (Vaillancourt 2004) 'Flexibility' is classified as adaptability that enables government or target groups to consider a range of compliance options for reducing GHG emissions under a time frame adjusted in agreement with their own priorities (UN 1997). 'Stringency for non-compliance and non-participation' is classified as rigidity in terms of implementation provisions for emitters that did not succeed in complying with or participating in the action. In terms of full involvement and participation in activity towards effective solutions, this focus on preventing non-compliance or non-participants can be judged or verified by certain criteria (Haites 2001). Lastly, 'feasibility of implementation' refers to the overall applicability of the instrument within an institutional and legal framework (Konidari 2007). For example, 'financial feasibility' is judged by institutional efficiency (OECD 2003a).

In this light, given the number of criteria for instrument analysis of GHG mitigation policy, this thesis will select the most critical and simple criteria. According to Hatch (2005), for policy instrument analysis with regard to environmental policy the following criteria are critical: effectiveness, efficiency, political feasibility, and technical innovation (Hatch 2005). The IPCC has also suggested a number of key elements in terms of overall performance for environmental policy instruments: 'design' 'implementation', 'participation', 'stringency' and 'compliance' (IPCC 2007b). These fundamental concerns are adopted here for instrument effectiveness on GHG mitigation. This thesis has thus adopted the five criteria for analysing the policy at national level. These are:

- Effectiveness for GHG Mitigation
- Cost Effectiveness
- Distributional Equity
- Political Acceptability
- Administrative Feasibility

'Effectiveness for GHG emissions' represents policies that achieve particular environmental objective and targets (Sorrell et al. 2003). This analytical element includes direct and indirect contribution to GHG mitigations (OECD 2001). It can be useful to judge (ex-post) and estimate (ex-ante) to what extent a particular instrument could influence GHG mitigation (Harrington 2004). 'Cost effectiveness' allows us to analyse whether a particular program achieves a goal, including the direct and indirect costs of administration and implementation of the policy (IPCC 2007b). Cost effectiveness also enables policy makers to determine what instruments can be cost-effective to an overall the policy. This is because often a specific environmental target provides a huge impact on the total cost of a policy, even if the target is achieved with cost-effective environmental instruments (Sterner 2003).

'Distributional equity' gives policy makers an idea of whether the instrument choice considered the distribution of emissions rights, compliance costs, and interest among countries or sectors (Vaillancourt et al. 2004). In terms of 'policy acceptability', Jaccard et al. stated that, in terms of evaluating GHG policy effectiveness, some prefer to define 'equity' instead of 'political acceptability'. However, they also recognised that defining political acceptability makes it much easier to identify instrument values and effectiveness, because more likely, only looking at a particular level of equity is hard to define in terms of value and sometimes invisible but still significant elements. It is also important that policy makers define the value of political acceptability which is essential to ensure whether politicians can precisely recognise sufficient support to implement a policy (Jaccard et al. 2004). The last element is 'administrative feasibility'. It is essential to be effective and efficient in implementation, and evaluation of 'administrative feasibility' pertains to whether the legal, institutional, and practical means exist in a policy implementation in an effective and cost-effective manner (De Coninck 2007). Although the IPCC (2007) referred to institutional feasibility generally involving equity and administrative feasibility, these elements are separated in this thesis, in order to emphasise a clear recognition of each of their contributions. Further details of the characteristics in these five criteria will be identified in the methodology chapter in this thesis.

2.2.2.2.3 Summary

This section aimed to begin developing a method for examining the effectiveness of 'soft' and 'hard' policy instruments, in the context of climate change policy. To begin with a fundamental approach to policy instrument examination was identified. This foundation constitutes a basic form of instrumental evaluation that incorporates five important elements.

In addition to these key elements of evaluation, there is a need to look at principles for a particular policy, in this case, climate change. With regard to the policy, there are arguably two relevant principles of policy evaluation: priorities and criteria. This thesis has identified four significant *priorities*, including i) *instrument design*, ii) *successful GHG mitigation*, iii) *program achievement*, and iv) *economic efficiency*. These are very important priorities in terms of conducting the most relevant approach for instrument analysis regarding the policy. This thesis has also addressed five *criteria*, namely effectiveness for a) *effectiveness for GHG Mitigation*, b) *cost effectiveness*, c) *distributional equity*, d) *political acceptability* and e) *administrative feasibility*. These two aspects, recognised as principles of climate change instrument analysis, are thus important and should be considered in terms of the most relevant approach in this thesis.

The following section will present a refined and practical method for examination of the effectiveness of 'soft' and 'hard' instruments in the policy through the incorporation of Lascourmes (2007)'s fundamental approach, which will be examined below in terms of specific policy principles relevant to climate change policy.

2.2.2.3 Refining methods for 'soft' and 'hard' instrument analysis in Climate Change Policy

This section aims to refine the most applicable approach for examining the effectiveness of 'soft' and 'hard' instruments, in the context of climate change policy. This refinement will be considered through two key elements of the instrument analysis as found in previous sections, including: Lascoumes's fundamental structure; and two principles for the instrument analysis. Four *priorities* are i) *instrument design* ii) *successful GHG mitigation* iii) *program achievement* and iv) *economic efficiency.* Five *criteria* are effectiveness for a) *effectiveness for GHG Mitigation* b) *cost effectiveness* c) *distributional equity* d) *political acceptability* and e) *administrative feasibility.* Firstly, this section will review characteristics of these three key elements in this chapter. It will then attempt to refine the most appropriate approach by transforming these key elements into an applicable method.

In respect of the first key element of the instrument analysis, in this chapter, the main significance of developing Effectiveness Analysis/ Identification & Trend Analysis/ Methods to demonstrate a simple approach to identify influence of instrument activities based on 'soft' and 'hard' classification due to the lack of method used for the effectiveness of 'soft' and 'hard' instruments. Therefore, this thesis firstly identified an approach from Lascoumes's five primary elements for fundamental structure of instrument analysis, as discussed previously, including:

1. Focusing on instrument analysis is a central issue in public policy and represents its particular political behaviour for a certain period.
2. Analysing relevant instrument choice is critical for meeting the policy objectives.
3. Evaluating the effectiveness of instruments is also a key concern.
4. Seeking innovative, effective instruments applicable to particular policy developments is a central aim.
5. Focusing on the influences of instruments for particular policy networks (i.e. country) is a worthwhile effort (Lascoumes et al. 2007).

This framework thus meets the demand for an essential and simple effectiveness of instrument activities, which can clearly identify influences of 'soft' and 'hard' instruments over time.

For the second key elements, as discussed previously, this thesis found two principles in terms of the instrument analysis for the policy. First, four priorities need to be considered for the analysis. These are: *instrument design*, *successful GHG mitigation*, *program achievement* and *economic efficiency*. These priorities recognised that there is a need to analyse instrument design at the bottom line. Meanwhile, successful GHG mitigation also requires the achievements of individual policy programs and with its cost effectiveness. Second, four criteria for analysing instrument influence on GHG mitigation, namely: *effectiveness for reducing GHGs*, *cost effectiveness*, *administrative feasibility* and *political acceptability*. Each criterion measures a different aspect of the instrument activities, and is required in order to achieve successful GHG mitigation. Given these principles, instrument design is an essential tool for instrument analysis, and in respect to climate change policy, the consideration of successful GHG mitigation, program achievements and cost effectiveness are inevitable. Moreover, with respect to evaluating instrument effectiveness, policy actors need to look at the four criteria in order to make better decisions. Given these, this thesis will now, in the following section, refine the most relevant approach by considering these elements.

These theoretical thoughts regarding methodology and the two principles above (*priorities and criteria*), have led to the establishment here of the most relevant approach to methods for identifying the influence of 'soft' and 'hard' instruments. This thesis has furthermore synthesised a variety of key aspects into five analytical perspectives, which it presents as the Synthesised Instrument Analysis [SIA].

This refined method, the SIA, is fundamental in determining the actual impacts of 'soft' and 'hard' instrument activities on the reduction in GHG emissions during a particular period. SIA has considered the three key issues from the theoretical thoughts discussed above, namely: a need for simple and fundamental instrumentation analysis; a need for identifying specific priorities of instrument analysis in terms of climate policy for the best emission reduction achievement; and a demand for finding the most suitable evaluative criteria for application to climate policy. In considering these theoretical thoughts, the SIA has developed five analytical phases, namely:

Descriptive perspective; *Transformative perspective*; *Analysis of instrument design*; *Evaluation of actual effectiveness*; and *Discussion*.
The SIA can be seen to comprise five phases:

Synthesised Instrument Analysis [SIA]

- Descriptive perspective (background of a program with its instrument approach)
- Transformative perspective (trend use)
- Analysis of Instrument Design (theoretical instrument analysis)
- Evaluation of Actual Effectiveness (impacts of instrument activities)
- Discussion (discussion about influences of instruments)

Each phase evaluates a different aspect of influence of a particular policy instrument in order to achieve successful GHG mitigation. The *Descriptive perspective* is the first stage of the method aims. The *Descriptive perspective* covers backgrounds of a policy program including: primary target; cost commitment; and instrument approach, which are necessary to provide the most relevant data of particular programs in order to conduct an instrument analysis. The *Transformative perspective* as the second stage will then identify the trend use of instrument activities, which is required in identifying periodical trends of 'soft' and 'hard' instruments in this thesis. The *Analysis of instrument design* will then address instrument designs for a particular program and how the design can be influenced from the theoretical point of view. This analysis also considers relevant choice of instrument design by the five climate change policy criteria: *effectiveness for reducing GHGs, cost effectiveness, distributional equity, administrative feasibility* and *political acceptability.*

The *Evaluation of actual effectiveness* then examines the effectiveness of 'soft' and 'hard' instruments in the policy. It will examine five criteria; *effectiveness for reducing GHGs, cost effectiveness, distributional equity, administrative feasibility* and *political acceptability*. In terms of the criteria for *effectiveness for reducing GHGs* and *cost effectiveness, distributional equity, administrative feasibility* and *political acceptability*, this thesis will utilise individual benchmarks of the criteria and analyse how these elements are influenced during policy implementation. In considering governmental literature qualitatively, the methods will be further described in the following chapter. Such qualitative analyses are also important to evaluate how policy activities are improved or delivered in terms of a successful policy instrument analysis in the policy.

Discussion considers all the results from each stage of the instrument analysis of a particular program and discusses the influence of activities of 'soft' and 'hard' instruments in considering the effects on the reduction of the national GHG emission. The details of the method will be further demonstrated in the next chapter.

With respect to the development of the refined SIA approach, the thesis firstly considers the first element of the fundamental structure including that: focusing on instrument analysis is a central issue in public policy. More specifically, the *Descriptive and Transformative Perspectives* consider an analytical component of instrument trend uses of instrument activities for a certain period. Secondly, it also covers the second element of the fundamental structure: analysing relevant instrument choice in *Analysis of Instrument Design*. Thirdly, the third element of the fundamental structure: evaluating effectiveness of instruments is applied in *Evaluation of Actual Effectiveness*. Fourthly, this refined approach also establishes a discussion of the effectiveness of instruments, which considers the fourth element of the fundamental structure: seeking innovative, effective, applicable instruments to particular policy development. Lastly, this thesis will apply its SIA approach to Australian climate policy at the national level, which meets the demand for the fifth element of the fundamental structure of focusing on analysing instrument analysis for particular policy network. Furthermore, this approach also contains four priorities for GHG mitigation analysis, namely *instrument design, successful GHG mitigation, program achievement* and *economic efficiency*. These priorities will help the further development of each phase of the refined approach, in the context of the policy (i.e. *descriptive, transformative perspectives, analysis of instrument design, actual effectiveness of instruments and discussion*). This SIA method adopted is proposed as a fundamental approach for evaluating the effectiveness of 'soft' and 'hard' instruments in climate change policy. The following chapter (Methodology) will further develop the detail of the SIA method.

2.2.2.5 Summary

In respect of Effectiveness Analysis/ Method used for examination of the effectiveness of 'soft' and 'hard' instruments in climate change policy, this thesis considers some key factors of the research contribution as discussed previously. Three key elements for the thesis approach were established, including: Lascoumes's fundamental structure and two principles for the instrument analysis for the policy (i.e. four priorities and five criteria). This thesis refined the most relevant approach for examination of the effectiveness of 'soft' and 'hard' instruments in the policy, by considering these three key elements of the instrument analysis. Finally, in considering these theoretical thoughts, this section has furthermore synthesised a variety of key aspects into five analytical perspectives: SIA method, which includes *descriptive perspective*, *transformative perspective*, *analysis of instrument design*, *evaluation of actual effectiveness* and *discussion.*

2.2.3 Summary of Section Two

Clues as to what frameworks and principles should be taken in order to provide the most suitable soft and hard policy instrument approach to the policy were provided in the second section of this chapter. This mainly attempts to develop the Identification & Trend Analysis/ Method and the Effectiveness Analysis/Method. Identification & Trend Analysis/ Method was derived from the 'instrumentalism' and 'coercive' analyses. Effectiveness Analysis/ Method synthesises a variety of points into five analytical perspectives: the SIA approach including: *descriptive perspective*; *transformative perspective*; *analysis of instrument design*; *evaluation of actual effectiveness* and *discussion and innovation.* The details of the Identification & Trend Analysis/Method and the Effectiveness Analysis/Method will be explained in the methodology chapter. The following section will conclude this chapter.

2.3 Conclusion

The aim of this chapter was to introduce the details of the background and significance of this study and the analytical framework by outlining the conceptual development of its 'soft' and 'hard' instrument study. This clarifies which aspects of methods should be addressed in order to examine influence in the context of climate change policy, in order to fulfil the first aim of this overall thesis to develop methods for identifying the influence of 'soft' and 'hard' instruments.

The first section of this chapter presented the background and significance of this study and the analytical framework by outlining the conceptual development of the 'soft' and 'hard' instrument study, by looking at policy instrument literature and 'soft' and 'hard' policy instruments. A look at policy instrument literature confirms the importance of the thesis's contribution, and of what should be achieved throughout this study. In order to develop a soft and hard instrument approach to the policy there is a need to address a number of important and specific points: (i) overcoming the lack of their classification (ii) overcoming the lack of examination of the trend use and (iii) overcoming the lack of examination of the effectiveness of 'soft' versus 'hard' instruments.

In considering these three aspects, two major analytical methods are developed in this thesis. The first analytical method [Identification & Trend Analysis/ Method] is to assess how a nation allocated its adoption of 'soft' and 'hard' instruments over a certain period, which develops the first and second aspects (i.e. the classification and examination of trend use). The second analytical method [Effectiveness Analysis/ Identification & Trend Analysis/ Methods] is used to examine the effectiveness of 'soft' versus 'hard' instruments in the policy, which develops the third aspect of developing methods for this study.

The second section of this chapter aimed to address these essential points by attempting to examine clues as to what frameworks and principles should be adopted in order to provide the most suitable 'soft' and 'hard' policy instrument approach to the policy. It concluded the Identification & Trend Analysis/ Method will be derived from the instrumentation approach using 'instrumentalism' incorporated with 'coercive analyses, which will be further examined in the following chapter. Moreover, a foundation for a method of examining the effectiveness of soft and hard instruments was developed through a synthesis of basic and policy specific principles of assessment for climate policy called the SIA method, which will be further described in the following chapter. The present chapter thus can conclude, having established a manner of developing a basis for classifying, identifying and examining soft and hard instrumental analysis, especially for climate change policy.

The next chapter will further demonstrate the two methods and their applicability, and present ways to complete the first aim of this overall thesis, that is to develop methods for identifying the influence of 'soft' and 'hard' instruments in response to the reduction in GHG emissions. This will present a clear explanation of how it is possible to demonstrate the thesis outcome.

Chapter Three
Methodology

3.0 Introduction

The aim of this chapter is to develop the two methods selected in Chapter Three, namely: The Identification & Trend Analysis/ Method to identify trend use of 'soft' and 'hard' instruments, illustrating how a government allocates its adoption of 'soft' and 'hard' instruments during the design period of a climate change policy; and the Effectiveness Analysis/ Method to examine the effectiveness of 'soft' and 'hard' instruments in a policy which contributes to reducing GHG emissions in a nation. The results in this chapter incorporated with the findings from Chapter Two complete the first aim of this overall thesis to develop methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions.

There are three sections to this chapter. The first section develops and describes the Identification & Trend Analysis/ Method for identifying the trend use in terms of reducing GHG emissions. The second section of this chapter develops and describes the Effectiveness Analysis/ Method for examining the effectiveness of 'soft' and 'hard' instruments in climate policy. Finally, this chapter concludes, having presented the methods for addressing the first aim of this overall thesis to develop methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions.

3.1 Identification & Trend Analysis/ Method: to identify the trend use of 'soft' and 'hard' climate policy instruments

The following section develops the Identification & Trend Analysis/ Method for examining the trend use in terms of reducing GHG emissions. In terms of developing the method, this thesis addressed two key aspects, namely: classifying policy instruments; distinguishing 'soft' and 'hard' instruments. This section will firstly develop an approach for classifying instrument categories. Secondly, it will develop an approach for distinguishing 'soft' and 'hard' instruments. Both approaches will be considered from existing approaches in the historical context, and new instrument classification criteria, namely: 'instrumentalism' incorporated with 'coercive analysis' from the instrumentalist approach. Finally this chapter will conclude with a method for identifying the trend use of 'soft' and 'hard' instruments in climate change policy.

3.1.1 Approach for classification of climate policy instrument categories

This section aims to introduce the method of classifying policy instrument categories in climate change policy. This is essential to classifying types of instruments, which helps to determine 'soft' or 'hard' instruments. In the previous chapter, this thesis concluded that a method for classifying instrument categories would be derived from an 'instrumentalist' approach as found in policy instrumentation literature. This section will thus consider ways of developing a classification of instrument categories by 'instrumentalism'.

This section will firstly describe critical aspects of classification of instrument categories by 'instrumentalism'. Secondly it will describe a number of classification methods from the instrument literature, in the context of climate change policy, and will introduce six key instrument categories, including *regulatory, voluntary/negotiated agreement*, *economic*, *research*, *information based* and *mixed instruments*. It will then summarise the characteristics of these six instruments. Finally, this section will conclude with the approach of classifying climate policy instruments.

3.1.1.1 <u>Critical aspects in 'Instrumentalism'</u>

With respect to a critical aspect of 'instrumentalism' in policy instrument study, this may be instrument categories in a particular policy context. Categorising instruments means identifying resources that governments can use to achieve their policy goals, which is very important to analysing a government policy approach (Bemelmans-

Videc et al. 1998). Policy actors need to select instrument categories depending on particular policy objectives, such as climate change policy (Stavins 1997). Identifying characteristics of policy instruments is also essential in terms of understanding the abilities of government resources (Anderson 1977). Thus, categorising policy instruments is essential in terms of this thesis's analysis. The following section will attempt to select what instrument categories can be most applicable in terms of instrument analysis for climate change policy.

3.1.1.2 <u>Instrument categories for Climate Policy</u>

Various categories for climate policy instruments at the national level[14] can be found in the fields of academic and practical study: for instance Stavins (1997), The United Nations Environment Programme [UNEP] (2007), Okinomous and Jepma (2007) and The Intergovernmental Panel of Climate Change [IPCC] (2007).

The classification of instrument categories tends to emphasise particular aspects of design and intention, depending on policy outcomes, delivery and process. Furthermore, these show merit when considering the different interventions of instruments in different ways (DEFRA 2005). However, five useful instruments can be distinguished here for the analysis of five useful instrument initiatives in order to identify the national instrument, including: *regulatory*, *voluntary/negotiated agreement*, *economic*, *research*, *information based* and *mixed instruments*. There are two reasons for this determination. Firstly, because these five classifications were basically used as indicators of classifying instruments in the Australian national reports to the United Nations in 2002 and 2005 (AGO 2002 and 2005). Another reason was to avoid the complexity of too much classification which becomes too

[14] Stavins (1997) identifies 'command and control and voluntary instruments (energy efficiency standards, product prohibitions, voluntary agreements) and market-based instruments (charges, fees, and taxes; tradable rights)'. The United Nations Environment Programme [UNEP] (2007) developed policy instruments for reducing GHG emissions in four categories including: 'control and regulatory instruments (normative and informative); economic and market-based instruments; fiscal instruments and incentives; and support, information and voluntary action'. Okinomous and Jepma (2007) developed six instrument categories emphasising their idea of 'policy interaction' for energy and climate change policy including 'subsidies, awareness, prescriptive, organisational measures, market-based, and command-and-control". The Intergovernmental Panel of Climate Change [IPCC] (2007) suggested eight levels of instruments for reducing GHGs at the national level, including 'regulations and standards', 'taxes and charges', 'tradable permits, voluntary agreements', 'subsidies and incentives', 'information', 'research and development (R&D)' and 'non-climate policies'.

complicated and merely provides a more precise categorisation (Kirschen et al. 1964). Therefore, this thesis has adapted six categories to comprise its Classification of Climate Policy Instrument Categories [CCPIC] in considering these thoughts, as follows:

Classification of Climate Policy Instrument Categories [CCPIC]

- Regulatory
- Voluntary/negotiated agreement
- Economic
- Research
- Information based instruments (i.e. information and education)
- Mixed instruments

The following section, will summarise the characteristics of the six key instrument categories in CCPIC. The categories are described here in the following order: *regulatory*, *voluntary/negotiated agreement*, *economic*, *research*, *information based* and *mixed instruments*.

Regulatory Instruments: Regulatory instruments cover a wide range of approaches, as the most traditional instrument, the so-called 'command and control' approach (IPCC 2007b). There are two phases of regulation types: 'performance standards' which set a limit on emissions and allow an emitter to choose how to meet the standards; and 'technology standards' which are requirements for specific design and operation (IPCC 2007b). Government ensures individual emitters must undertake to meet their environmental targets and to control their non acceptance by demanding financial penalties for non compliance (Okinomou et al. 2007). Furthermore, regulatory activities provide for direct or indirect intervention to achieve emission control[15].

Voluntary/negotiated agreements: Voluntary instruments include voluntary and negotiated agreements. They are usually conducted by providers or individual firms in consultation or negotiation with a public authority and agency. Their effectiveness is

[15] Direct and indirect intervention include: '[rationing and prescription (e.g. emission quota, mandatory technologies and procedures), performance standards and benchmarks (e.g. total material requirement and building performance standards)'. Perrels, Adriaan 2001. "Efficiency and Effectiveness of Policy Instruments: Concepts and Practice". Workshop on Good Practices in Policies and Measures, 8-10 October 2001, Copenhagen.

enhanced if they are implemented with other policies in terms of achieving their desired performance (Okinomou et al. 2007). Not all voluntary instruments are purely voluntary; some agreements can contain penalties or rewards systems along with participation in the agreement or accomplishment of the commitments between firms and government (IPCC 2007b). Voluntary instruments delegate a large degree of freedom to companies, the public or agencies within the framework of persuasion or a negotiated context such as emission permit trading, green certificates and other negotiated agreements, and can be mixed with other instruments (Parrels 2001). Voluntary instruments can be described as 'unilateral commitments', 'self-regulation', 'public voluntary schemes or voluntarism: voluntary challenge', 'voluntarism: voluntary challenge', 'voluntarism: negotiated agreement', and 'co-regulation or joint liability agreements'.[16]

Economic instruments: Economic instruments are defined as price signals to consumers and producers and reminders of the external costs, benefits of goods and activities (OECD 2002). Two dimensions exist in the phase of economic instruments: 'incentives' and 'disincentives' (Bemelmans et al. 1998) or market-based instruments' (OECD 1994). Incentives are defined as 'affirmative, promoting, encouraging' such as subsidies, grants, and loan exemptions. On the other hand, disincentives are defined as 'negative, restraining, discouraging' such as taxes, charges, and fees (Bemelmans et al. 1998). In terms of climate change policy, carbon tax and charges and carbon emission trading permits are critical fiscal interventions (Okinomou et al. 2007). Thus incentives in climate change policy are subsidies, tax credits and vouchers, grants and loans. Disincentives include emission tax and charges, and carbon emission trading permits and quotas. The range of functions can either increase the price of polluting to the polluter or decrease the price of being cleaner, and thereby encourage more action

[16] Unilateral commitments: Unilateral commitment between individual companies or associations. Self-regulation: Individual codes of practice between individual companies and/or NGOs. Voluntarism: Voluntary challenge: Initiatives set by governments for rules and conditions but free-participation. Voluntarism: Negotiated agreement: formal contracts between industry and public sectors and authorities but no penalties for non achievement. Co-regulation or joint liability agreements: formal contracts between industry and public sectors and authorities with penalties for non-meeting objectives and/or noncompliance, depending on existing constitutions. These are based on: Börkey and Lévêque (2000) with 'unilateral commitments, public voluntary schemes, and negotiated agreements'; Bailey and Rupp (2005) with 'Joint liability agreements' or 'coregulation'; and Paton (2002) with 'unilateral initiatives, provide codes, voluntary changes, and negotiated agreements'; Gunningham and Grabosky (1998) with 'unilateral initiatives, self regulation, voluntarism/voluntary changes, and voluntarism/negotiated agreements'.

to invest in energy efficiency, abatement and fuel switching or renewable energy (Perrels 2001).

Research instruments: Research instruments are often termed Research & Development [R&D] instruments, which are significantly useful for developing energy efficiency (Okinomou et al 2007) and have the potential to contribute to the transformation to a low carbon society with reduced greenhouse gas emissions (European Communities 2007). This type of instrument involves direct government funds and investments that are intended to generate innovative approaches for mitigation and adaptation, and the physical and social infrastructure for greenhouse gas emission abatement (IPCC 2007b).

Information-based instruments: Information-based instruments include education, awareness and campaigns. These may contribute to the public's standard knowledge of climate change policy (Okinomou et al. 2007). Information devices can be acknowledged as public disclosure requirements, and may positively affect environmental quality by informing consumers or polluters of the lack of information availability for the environmental consequence of their activities, initiatives, and support, but are criticised as well as inefficiently costly and burdensome. However, the instruments themselves basically do not have any capabilities for penalising environmentally harmful behaviour (IPCC 2007b). Three phases of information-based instruments can be described as 'publication availability', 'education and awareness', 'public disclosure'.[17]

Various Mixes: Mixed instruments indicate that a policy activity is classified as a multiple instrument choice. This categorises a policy program as a mixed approach and is not counted within more precise categories by the other five instruments which were described above. The table below illustrates simple instrument classification.

[17]'publication availability': information availability is supplied to the public. 'education and awareness' includes public education, awareness and campaign and training. 'Public disclosure' includes certification, award, licence, reporting requirements and labelling and rating.

Chart 3.1: CCPIC

Instruments	Elements
Regulatory instruments	Technological standard: Rationing and prescription (e g Emission quota, mandatory technologies and procedures) Performance standards and benchmarks (e.g. total material requirement and building performance standards) Financial penalties for non compliance
Voluntary/negotiated agreement	Voluntary participation, initiatives and activities Negotiated agreement between emitters, between emitters and government
Economic instruments	'Incentives' includes: subsidies, grants and loan exemptions 'Disincentives' include. emission tax and charges, and carbon emission trading permits and quotas
R&D instruments	Research and Technology Development
Information-based instruments	Education, training, awareness and campaigns, publication availability
Mixed instruments	Combine more than one single instrument

This section described the types of instruments and types of instrument classification in historical contexts. In terms of classifying climate policy instruments, the CCPIC approach developed here has included six instrument categories, namely: *regulatory, voluntary/ negotiated agreement, economic, research* and *information-based* and *mixed instruments*. The six categories are essential tools in order to demonstrate the trend use of instrument design and will form the basis here of identifying 'soft' and 'hard' instrument activities for climate change policy. These types are useful in identifying general trend use in climate change policy but are not sensitive to levels of government coercion in policy programs, which is an important factor to consider when looking to analyse policy use and effectiveness. Thus, the following section further develops an approach for determining the level of coerciveness between 'soft' and 'hard' instruments.

3.1.2 Approach for determination of 'soft' and 'hard' climate policy instruments

The objective of this section is to introduce the approach used to distinguish 'soft' and 'hard' instruments in order to examine the trend use of instrument coerciveness utilised in climate change policy. Firstly, this thesis will examine ways to characterise the relations between 'soft' and 'hard' instruments in the historical context of 'coercive analysis' in the instrumentation study. Secondly, it will demonstrate the approach to determine whether an instrument is 'soft' or 'hard'. Finally, this section will conclude with the thesis's proposals for how instrument design can be classified as either 'soft' or 'hard' in the context of climate change policy in a particular nation.

3.1.2.1 Historical studies on 'soft' and 'hard' instruments in 'Coercive Analysis'

As decided in the previous chapter, this thesis, developed a method for distinguishing 'soft' and 'hard' instruments, derived from 'coercive analysis' in the policy instrumentation study. In the historical context of 'coercive analysis', a range of schemes has been proposed for 'instrument categorisation' to determine the relations between 'soft' and 'hard' instruments.

With respect to the basic knowledge and frameworks used for government resources under policy instrument categorisation, Cushman (1941) classified the differences as 'coercive' and 'less coercive' or 'non-coercive' from the institutional perspective with regard to size, structure and interim mechanisms. Anderson (1977) further developed theories for 'voluntary' instruments utilising 'non-intervention' methods (i.e. market mechanisms, civil society and household) and 'mandatory' instruments utilising 'intervention' (i.e. structured options, biased options and regulation). Hood (1986), categorised criteria for distinguishing the level of 'soft' and 'hard' with four elements, including 'nodality, authority, treasure and organisation'. McDonnell and Elmore (1987) explored the differences in relations in terms of instrument effectiveness and classified 'mandate, inducements, capacity-building and system-changing'. Schneider and Ingram (1990) suggested that the differences are based on 'behavioural demotions of policy instruments'; which can be categorised into these elements 'incentives, capacity-building, symbolic and horizontal learning'.

After these developments, analysts started to question the 'degree of coercion' of instruments, and further work was developed as a basis for these historical instrument studies. Doern and Phidd (1992) offered an explanation of relations between 'self-regulation' through to 'public ownership' and indicated that all policy communities can be divided into two streams: governmental and private knowledge. Ayers and Braithwaite (1992) also classified instruments with three levels of restriction by 'power, incentives persuasion and education'. More specifically, Howlett and Ramesh (1995) focused on the relationships between regulatory and non-regulatory classification, and considered 'voluntary instruments' and 'compulsory instruments' based on 'voluntary (i.e. family and community, voluntary organisation); mixed based (market, information and exhortation, subsidies, action of property rights, tax and user charges offsets); and regulatory (regulation, public enterprise and direct provision)'.

In practical terms, with respect to environmental policy, including climate change policy, instrument studies tend to focus more on an 'optimal mix', whereby environmental instrument design requires a better use of environmental regulations with uncertainties regarding the voluntary basis for complex issues. While environmental instrument design focuses on more mixed solutions, identifying the relations between 'soft' and 'hard' classification becomes more complex. However, Gunningham and Grabosky (1998) identified 'unilateral initiatives, self regulation, voluntarism, voluntarism with negotiated agreements', with emphasis on a smart design of regulation. Welch and Hibiki (2003) further distinguished coercive and non-coercive bargaining relationships between government and industry by using more institutional factors in order to make better voluntary environment agreements and ensure that they are effective.

Price (2005) divided relationships based upon implementation with voluntary agreements programs into three broad categories: completely voluntary; persuading actions such as threatening the future implementation of regulations or GHG emission taxes as a motivation for involvement; and strong policy frameworks incorporating incentives and penalties. It is concluded here that it is essential for voluntary agreements to include stringent requirements for firms to manage their energy use and GHG emissions in order to meet their reduction targets and to report their progress to government. The relationship between 'soft' and 'hard' instruments can be examined for differences in instrument characteristics, however, they can also become more mixed and complicated, with analysis attempted to identify relationships between 'soft' and 'hard' instruments such as the level of government control. More specifically, with respect to environmental policy, analysis has focused on relations based on connections between government, private firms and the public in order to meet specific policy targets such as reducing GHG emissions.

Sullivan and Wyndham (2001), acknowledged how illustrating the relations between 'soft' and 'hard' instruments including policy influences and outcomes, tends to lead to uncertainty, especially where mixed instruments are applied. This is because regulatory or voluntary instruments generally do not exist individually in a given context and are usually combined with a variety of other instruments which again depend on policy targets (Sullivan and Wyndham 2001). This reveals that the historical context of 'coercive analysis' including 'instrument categorisation' and 'degree of coercion' has not yet proposed a clear means of illustrating how to distinguish whether an instrument is 'soft' or 'hard'. Thus there is a need to develop a simple and clear method of identifying how 'soft' and 'hard' instruments can be classified. In the following section, this thesis examines how such a method could be developed to distinguish between 'soft' and 'hard' instruments.

3.1.2.2 Determination of 'soft' and 'hard' climate policy instruments

This section will demonstrate an approach that can be used to distinguish between 'soft' and 'hard' climate policy instruments. As described in the previous chapter, the classification of 'soft' and 'hard' instruments can be defined as: the level of governmental power, pressure and stress on the public. Moreover, policy instruments are a package of techniques under the power of government authorities to ensure support and effect social change to their goals. Policy will not work appropriately if a government does not utilise its power with policy instruments to ensure the public meets its own social expectations (Bemelmans-Videc et al. 1998: 1-21). Furthermore, policy instrument analysis reveals a theorisation of relationships between the governing and the governed. Every instrument involves a form of knowledge about social control (i.e ownership by governments and/or privates) and ways of practicing it. Policy instruments thus mean a form of power (Halpern et al. 2008). Given this, the actual class of instrument coerciveness or power relations can be regarded as the level of social control by instrument uses associated with the power of ownership. In other words, policy instruments provided by a government means the government has the ownership of the instrument coerciveness. Therefore, the government provides social control by using instruments in order to achieve its policy goals. The understanding of 'soft' and 'hard' instruments thus reveals coerciveness/ power relations: which in this thesis will refer to the level of social control by instrument uses by governments.

In order to devise a simple and clear method of identifying power relations, this section attempts to distinguish between 'soft' and 'hard' instruments. It will examine several perspectives: government intervention; environmental and climate change policy; and consideration of studies on the power relations of instruments. The examination will also consider adapting any relative identities between 'soft' and 'hard' whereby 'soft' instruments may be recognised as non-coercive and less coercive, non-mandatory and voluntary, and 'hard' instruments may be recognised as coercive, mandatory and regulatory.

3.1.2.2.1 Governmental Intervention

Coercive ('hard') instruments are often referred to as rules or any interventions by government to steer the economy and can be seen as mechanisms of social control (Scott 2003). Moreover, regulations are simply the legal tools that support the functions of forming structure, monitoring and enforcement (Foley 2004). On the other hand, voluntary 'soft' instruments are intended to have a sense of non coerciveness or less coerciveness in order to avoid costly policy actions for environmental policy; private companies especially do not typically wish to accept legislated consequences. This type of instrument is therefore often based on: non legal binding rules; stringent monitoring and enforcement with guidance to meet objectives; timeframes; and public disclosure (OECD 2003b). Furthermore, 'soft' instruments also avoid negative impacts in terms of administrative costs for regulators, excessive regulation and afford greater flexibility to avoid objectives-specific target setting and achieving, controversial implementation, and also remove the necessity for legislation (Nunan 1999). Judgment regarding the level of governing intervention is essential in order to classify whether an instrument is binding or non-binding (Highley and Leveque 2001). In terms of identifying governmental intervention, it is also important to address whether there is strong educational and financial support (incentives) attributed by government, including technical support or training for the public or firms, which may encourage further public awareness and development of new technologies and practices. Furthermore, there is a need to ensure that there is strong intervention to support particular actions that give the public and private firms incentives to take further initiatives (Burritt et al. 2005). Governments need to legislate for penalties for non involvement and noncompliance from the private and public sectors (Price 2005).

Given this background, it is obvious that 'soft' and 'hard' instruments can be classified as the level of government intervention. More specifically, several parameters can be determined by the level, including legal requirements, financial penalties, administrative rules, prohibitions and market solutions. However, Gunningham et al (1998) state that governments controlling the level of their interventions are dependent on purposes of different policy outcomes for the appropriate policy activities. Thus, in order to understand a particular distinction of whether instruments are 'soft' or 'hard', it is necessary to know particular policy circumstances and outcomes. The following section will examine levels of coerciveness in the field of environmental and climate change policy.

3.1.2.2.2 Environmental and climate change policy

With respect to environmental policy instruments, 'soft' instruments are more popular than 'hard' instruments. A voluntary environmental policy such as climate change policy tends to aim at meeting its targets without employing direct coercion through law or inducing change by altering relative prices, and includes voluntary, procedural and information-based policy (Hertin et al. 2004). The voluntary approach ('soft') by government is sometimes found to have no penalties for noncompliance, and freedom to create 'windfall win-win systems' by individual industry approaches to find equitable approaches for polluters taking responsibility for their actions (O'Brien and Vourc'h 2001). These voluntary based instruments ('soft') can also be defined as 'persuasive instruments' that seek to motivate more environmentally friendly behaviour without imposing direct policy 'sticks' or 'carrots' (Rupp and Bailey 2003). The 'soft' instrument model in the field of environmental policy is also not intended to restrict participation, but rather to encourage industry and the public to maintain their social responsibility (Jordan et al. 2005). In the context of climate change policy, the non-binding model does not stress competitiveness or levy systems (i.e. tax, trading permits and trading green energy certificates), which might have a negative impact on industry or the general public (e.g there could be a costly burden if there are not enough incentives) (OECD 2001a). Moreover, legally binding 'contractual improvements' are essential for strong governmental support that may restrict companies in terms of their desired outcomes but allow further enhancement of the effectiveness of GHG policy, which is not meant to be restricted in a non-binding model (Taplin 2004). On the other hand, these systems may promote environmental equity and encourage the public or industry to take action regarding GHG emission abatement (OECD 2001b). In the meantime, in analysing the relationships between 'soft' and 'hard' instruments, a number of analysts have also demonstrated the particular effectiveness of the level of coerciveness of policy instruments including: a better regulatory framework for environmental policy; alternative regulatory systems for environmental policy; and effectiveness of environmental voluntary agreements influenced by government incentives and penalties (Gunningham et al. 1998). These aspects should not be ignored in this study, and will be further explained in the following section.

3.1.2.2.3 Consideration of studies by other analysts of instrument power relations

In the context of the power relations between 'soft' and 'hard' instruments, Ayers and Braithwaite (1992) have developed an improved regulatory framework for environmental policy. Their 'responsive regulation' explains certain stages where governments utilise and self regulate without non-direct and non-invasive responses. According to this approach, analysing the level of regulation is very important to how effectively individual firms have self motivated to regulate themselves. It also suggests that initial response to the demanded behaviour arises from persuasive classification to encourage self-action, and then may need to escalate to more punitive responses that directly influence behaviour. Gunningham et al. (1998) also reconceptualise alternative regulatory systems for environmental policy, and emphasise a shift from traditional, hierarchical regulation towards a different set of instruments in making environmental policy by expanding enforcement faces. Accordingly, three types of faces are on a pyramid for regulatory instruments: 'government as regulatory', 'business as self regulator', and 'external agents as regulator'[18]. Utilisation of traditional government intervention is essential and can be effective. However, the authors also emphasise that it can be very effective when self-regulation places some restrictions on the business and there would be a more powerful restriction with integration with external agents controlling by their observation such as a governmental independent body, or professionals employed by government to monitor or report environmental actions.

Another approach concerns power relations between government and emitters. Price (2005) demonstrated that relationships exist between the difference in power of voluntary environmental agreements and their effectiveness to meet private companies' GHG emission targets. Price also concluded that completely voluntary agreements have less government pressure for participation, which is associated with fewer incentives and no penalties. She also notes that more restriction, in practice, tends to contain a more incentive-based approach with less stress on regulated sanction. This results in having the strongest agreement with much higher incentive intervention and increased regulations or taxes similar to penalties. Welch and Hibiki (2003) also note that to ensure strong participation to achieve particular targets, government often considers more costly and legislated sanctions such as penalties for noncompliance and nonparticipation.

In this light, government interventions have influenced policy instrument activities. Furthermore, they are better combined with voluntary agreement frameworks in the context of climate change policy; for instance, self-regulation and third party involvement can be considered as a significant factor of government intervention. This study should not ignore such 'alternative instrument uses' with various power interrelations as suggested by some analysts. However, in this study, self-regulation and third party involvement are not regarded as a government intervention. There is also a need to consider a broad level of government intervention integrated with a particular emphasis upon incentives and penalties not only for voluntary systems but also other systems such as regulatory ones, and a need to measure their influence with respect to their climate policy targets. However, this thesis will place more emphasis

[18] the first face is the traditional 'government as regulatory'; the second is 'business as self regulator'; and the third is 'external agents as regulator'; which has power to oversee self-regulation (e.g. Environmental Management Systems [EMSs]).

on determining the simple classification of 'soft' and 'hard' policy instruments. This thesis will also focus on establishing the specific key elements of functional policy activities, such as examining whether a national program is a 'soft' or 'hard' instrument by looking at a number of key elements such as setting targets and monitoring systems, rather than measuring degrees of reliability of persuasion or restriction or balance between the restriction and cost effectiveness under an instrument.

Given this background, this thesis will adapt four perspectives to distinguish the level of coerciveness between 'soft' and 'hard' instruments, through a number of functional elements for 'soft' and 'hard' instruments, namely: government intervention; legal requirements, financial penalties, administrative rules; prohibitions; market solutions; specific demands in environmental and climate change policy; and consideration of studies by analysts on the power relations of instruments.

Chart 3.2: Determination between 'Soft' and 'Hard' Climate Instruments [DSHCI]

1. Information Provision (e g information support)
2. Educational Support by Government (e g. technical support, training, and education)
3. Incentives and Subsidies by Government (e g government's financial supports)
4. Specific and Measurable Emission Reduction Targets in a program (e g quantified and ideal is realistic)
5. Timeframe in a program (e.g clear measurable timeline identified as short, medium and long term)
6. Guidance or Guidelines for implementation (e g details of implementation audited or licensed by government authorities)
7. Monitoring (e g activities are monitored or certified by government authorities)
8. Reporting and Certification (e g periodically, annually and with quantitative reports on their actions Targets are reported or certified by government authorities)
9. Auditing, Reviewing and Certification (e g reports are audited, reviewed or certified by government authorities)
10. Public Disclosure (e g public recognition mandatorily required by governments)
11. Committed Contractual Improvement (e g. mandatorily committed to by government)
12. Any Market Device or creation of competitiveness (e.g. emission trading, tax systems, green certificates)
13. Government Regulation for Standards (e g building codes or energy performance standards)
14. Government Penalty of Polluter Pays (e g legally required)
15. Government Penalty for Nonparticipation (e g same as above)
16. Government Penalty for Noncompliance (e.g. same as above)
17. Government Penalty for Failure to Meet Targets (e.g same as above)

Level of Instrument Dominance

- 0,1-4 Least Dominant (Soft)
- 5-9 Moderately Dominant
- 10-13 Highly Dominant
- 14-17 Most Dominant (Hard)

In terms of distinguishing between 'soft' and 'hard' instruments in climate policy, the thesis has developed its own DSHCI approach with seventeen criteria, which focus on the level of instrument dominances with key criteria to classify the 'soft' and 'hard' instrument designs of a national government in terms of reducing GHG emissions. All of the criteria listed above are to be considered together. These criteria may also help policy makers appreciate which level of coerciveness of policy instruments is employed by government initiatives.

On the bottom right of the chart, it is also indicated that there are four levels established in each of the criteria, used for determining whether instruments are soft or hard, and these are: *least dominant*, *moderately dominant*, *highly dominant* and *most dominant*. Least dominant refers to the softest instruments. Moderately dominant refers to relatively softer instruments. Highly dominant refers to relatively harder instruments, whereas most dominant refers to the hardest instruments. As previously mentioned, they are simply defined in this study as functional key elements of evaluating the level of instrument coerciveness. The relative levels, moderately dominant and highly dominant, divide these two extremes. Instruments are categorised within this four level scheme in accordance with their makeup in terms of these 17 key elements in the criteria. This measurement scale allows for a simple and clear classification of the level of coercion between 'soft' and 'hard' instruments.

3.1.2.3 Criteria designed in DSHCI

Each criterion allows us to address a different aspect of dominance of a particular policy instrument in order to determine whether an instrument is 'soft' or 'hard'. *Information Provision* is defined as an information support by a government. Information provision may be a symbolic action of government intervention for any initiatives for emission activities. Voluntary initiatives often rely on this support (Hertin et al. 2004). *Educational support* is defined as an educational intervention by a government including technical support and training. This may promote technological development and public awareness but may also discourage a large industry if there is not enough power and knowledge in the government (Burritt et al. 2005). *Financial grants* and *Incentives and subsidies* represent other government interventions, used to ensure substantial development by promoting fiscal initiatives (OECD 2001a). These incentives can provide awards or financial support to develop technologies in firms and the public by way of encouragement (Burritt et al. 2005).

Specific and measurable emission reduction targets: that governments enforce activities to ensure that clear objectives and targets are met, especially with quantified measures (i.e. government can easily measure the outcomes) for particular program activities regarding climate change policy. In the case of 'non-coercive' instruments, which allow for free choice, private or public interests often prefer to set their own targets rather than have targets set by government (Nunan 1999). *Timeframe*: refers to government-based timelines for short, medium and long-term targets. *Guidance* and *monitoring*, and *reporting and certification*: governments often intervene in private or public activities to provide guidance in order to make accurate adjustments and to enhance effectiveness (OECD 2004). For *monitoring* and *reporting and certification*, it is important that governments require: annual reports and quantitative reports on their actions toward the targets (Foley 2004). However, there are still some uncertainties regarding the quality of judgments under different institutional regimes, such as direct monitoring processes by governments, self reporting systems by individual emitters, or mediated reporting schemes between emitters and third parties (offered by government) (OECD 2004). With regard to the elements *guidelines, monitoring* and *reporting and certification*', these address whether direct government intervention dominates in an instrument design.

Public disclosure is another key element of government intervention. Governments can enforce public recognition to expose the nature of policy activities, individual efforts, and progress (OECD 2004). *Committed contractual improvement* is a commitment with government between private and/or public interests, in which they must consider further improvement of addressed issues through their reviews (Taplin 2004). *Market competition* includes carbon trading, tax systems and green certificates, and allows government control systems to encourage market activities in climate change policy activities in the private and public sectors. The elements may also encourage technology developments and create equity with environmental activities and sustainability integrated into economic solutions for global climate issues. However, there are still uncertainties regarding global integration and potential financial risks; for instance, one country adapts and the other does not, which may render actions ineffective (OECD 2001b). *Regulation for any standards in governments* by which governments ensure that firms utilise their technology or products to establish a baseline for the minimum level of emission technologies and performances; such as building codes, labelling, and product standards (Bruneau 2005 and UNEPCEU 2007). *Penalty of polluter pays*: government imposes environmental equity and polluter responsibility on emitters. *Penalty for nonparticipation*, *penalty for noncompliance*, and *penalty for failure to meet targets*; governments penalise firms for their activities with nonparticipation, compliance and meeting their targets, following powerful governmental intervention (O'Brien and Vourc'h 2001).

This section developed an approach for determining 'soft' and 'hard' climate policy instruments. Firstly, it described historical approaches. It then examined clues to classifying 'soft' and 'hard' instruments, and found several key perspectives in order to determine the classification of 'soft' or 'hard', namely: government intervention, environmental and climate change policy and the considerations of instrumental power relations by scientists for policy instrument activities regarding climate change policy. Finally, this section established the DSHCI approach for determining 'soft' and 'hard' instruments with 17 elements including four levels of instrument dominance: *least dominant*, *moderately dominant*, *highly dominant* and *most dominant*. The following section will summarise Identification & Trend Analysis/ Method for identifying the trend use of 'soft' and 'hard' instruments.

3.1.3 Summary

This section has presented the first part of this current chapter. It aimed at developing Identification & Trend Analysis/ Method for identifying the trend use in terms of reducing GHG emissions in climate change policy. Two approaches are developed for the aim. The approach is used for classifying climate policy instruments. It concluded that this thesis has adapted the CCPIC approach comprising six instrument categories [regulatory, voluntary/voluntary agreement, economic, research, information-based and mixed instruments]. The second approach is used for distinguishing between 'soft' and 'hard' instruments in climate change policy. The DSHCI approach was developed with the method with 17 criteria which focus on the level of instrument dominances under the instrument designs of a national government in terms of reducing GHG emissions. Both approaches will be incorporated in terms of examining the trend use of 'soft' and 'hard' instruments in climate change policy as Identification & Trend Analysis/ Method.

3.2 Effectiveness Analysis/ Method: to evaluate the effectiveness of 'soft' and 'hard' instruments in climate policy

The second part of this chapter develops Effectiveness Analysis/ Method for examining the effectiveness of 'soft' and 'hard' instruments in climate policy. The method will develop key elements of the SIA approach, as concluded previously. Five stages are included in the SIA approach: *descriptive perspective*, *transformative perspective*, *instrument intervention analysis*, *evaluation of actual effectiveness* and *innovation and discussion*. Each stage requires different aspects. This section will firstly describe the SIA in each stage. This section will then conclude with the method to be employed in this thesis for an approach to analysing the effectiveness of 'soft' and 'hard' instruments in reducing GHGs in climate change policy.

3.2.1 Descriptive Perspective

Descriptive perspective is the first stage of the SIA approach for examining the effectiveness of 'soft' and 'hard' instruments in climate change policy. The method aims to describe the background of a case study evaluating the effectiveness of 'soft' and 'hard' instruments. Vedung (2008) suggests that, in practical terms, an instrument analysis should emphasise 'ends and means'-analysis. More specifically, the analysis needs to identify what goals are centralised in the policy targets. It also needs to ascertain what performance indicators are clearly designed. Thirdly, it needs to reveal what range of instruments is incorporated. Lastly, it needs to show how these instruments are combined in terms of reaching targets in a particular period.

This thesis adapts a number of the above elements in broad terms, in order to construct a *descriptive perspective* of a particular case study, for example, primary target, time line, instrument approach and performance indicators.

3.2.2 Transformative Perspective

Transformative perspective is the second stage of the SIA. The Identification & Trend Analysis/ Method in this stage aims to illustrate trend use of policy instruments for case studies. This Identification & Trend Analysis/ Method identifies what types of instrument are adapted over time, and examines trend use of 'soft' and 'hard' instruments over the same period.

Firstly, the *transformative perspective* will describe what types of instrument are adapted in a case study over time by using the six key instrument categories, including *regulatory*, *voluntary/negotiated agreement*, *economic*, *research*, *information based* and *mixed instruments*. This approach allows this thesis to identify any change of instruments in the case study over the timeline. Secondly, it examines the transformation of 'soft' and 'hard' instruments during times of change by utilising the method previously developed for determining 'soft' and 'hard' instruments for climate change policy. This examination will clearly demonstrate the instrument adaptation (i.e. instrument classification and 'soft' and 'hard' ideology) over time.

3.2.3 Analysis of Instrument Design

This part will detail a method for *analysis of instrument design*, which is the third stage of the SIA. As discussed previously, this thesis adapts five major criteria[19] for climate change policy regarding the reduction of GHGs. Furthermore, this thesis, in the previous section of this chapter, also categorised instruments into six types,

[19] These are *effectiveness of reducing GHGs*, *cost effectiveness*, *distributional equity*, *political acceptability*, and *administrative feasibility*.

namely: *regulatory*, *voluntary/negotiated agreement*, *economic*, *research*, *information based instruments* and *mixed instruments*[20].

Jaccard et al. (2004) state that establishing criteria for describing and analysing both 'conventional policy options' and 'critical instrument innovation', is necessary to create the most relevant instrument analysis for climate change policy theoretically and practically. The 'policy options' require instrument categorisations and should be selected in different ways for different policy purposes. They also state that a policy may be politically acceptable, but may not be able to achieve the intended environmental target. A policy may be productive, but may not be administratively feasible or cost-effective. While no policy performs perfectly against critical criteria for reducing GHG emissions, some do better than others. Thus the theoretical relationships between the selected criteria against the categorised instruments should be identified clearly in order to present the most appropriate instrument analysis.

This section will firstly demonstrate details and characteristics of each of the five selected criteria for climate change policy (i.e. *effectiveness of reducing GHGs*, *cost effectiveness*, *distributional equity*, *political acceptability*, and *administrative feasibility).* It will then examine the particular characteristics of each of the categorised instruments (regulatory; voluntary/negotiated agreement; economic; research; information based instruments) against the selected criteria for instrument analysis, which covers characteristics, strength and weakness. Finally, it will conclude with the development of the method for theoretical instrument analysis for climate change instrument design.

3.2.3.1 Characteristics of the five criteria

The following section examines the characteristics of the five selected criteria for evaluation of climate change policy instruments: *environmental effectiveness for GHG emissions*, *cost effectiveness*, *distributional equity*, *political acceptability* and *administrative acceptability.*

[20] 'Various mixes' is not categorised as a particular characteristic of an instrument. Therefore, for a theoretical instrument analysis, it is not considered.

3.2.3.1.1. Environmental effectiveness for GHG emissions

As mentioned before, to identify effectiveness for GHG emissions means that policy achieves particular environmental objectives (Sorrell and Sijm 2003). Addressing environmental effectiveness especially in terms of achievement or failure helps us to distinguish actual contribution to GHG mitigations (OECD 2001a). The results also allow policy makers to judge and estimate to what extent particular instruments may influence GHG mitigations (Harrington et al. 2004). Moreover, this criterion allows us to analyse the direction of particular program targets, which provides appropriate guidance for the future instrument selections for environmental effectiveness regarding climate change policy (Ellerman 2006).

3.2.3.1.2. Cost effectiveness

Cost effectiveness allows us to identify the instrument selection in achieving a particular program goal with the desired lowest costs, or with meeting the determined costs including the direct costs of processes for administration and implementation of the policy, as well as indirect costs (IPCC 2007b). This criterion determines which instruments can be cost-effective for an overall environmental policy. This is because a specific environmental target often has a huge impact on the total cost of a policy, even if the target is promoted on the basis of cost-effective environmental instruments (Sterner 2003). This criterion also allows us to assess the timing for adapting costly instruments, given the need sometimes to wait for instruments until they become available. For instance, creating new institutions or establishing new high cost technologies will incur high economic impacts on policy compliance if no such facilities already exist. Thus, the ideal in terms of costs may be to ensure limiting the creation of facilities and simplifying the implementation process as much as possible (IPCC 2007b). Lastly, ex-ante and ex-post evaluations frequently reveal discrepancies. This criterion allows policy makers to judge whether the costs of particular program goals have been overestimated. An expense estimate given by instrument selection often shows that the cost of generating market-based instruments tends to be higher than estimates by other means (Harrington et al. 2000). Thus there is a need for careful determination of the appropriate cost estimation for future selections by comparison with past records.

3.2.3.1.3 Distributional equity

There are three dominant key elements in *distributional equity*: equity, responsibility and environmental sustainability. Equity is a key significant element for consideration in terms of instrument assessment for reducing greenhouse gas emissions, and gives us an idea of whether the instrument choice has sufficiently considered distribution of emissions rights, compliance costs and interest among countries or sectors (Vaillancourt et al. 2004). The possible consideration of equity can be considered broadly as 'global & intergenerational' (IPCC 2001)[21], and 'intra-country equity' (Scrimgeour et al. 2005).[22] Another key element, is responsibility (ability to pay), which can ensure whether there is power or the capability to control and limit polluters producing emissions, for example via penalties or levies (Goulder 2000). Environmental sustainability is another significant element deserving consideration in climate change policy. Sustainability requires an individual program to meet a long term perspective to reduce GHG emissions step by step considering social, environmental and economical aspects (IPCC 2007b). If there is not enough financial support from governments for public or individual emitters, they may not reach either environmental or their financial and social goals. Therefore, in this case, the level of sustainability is inappropriate (Riggs 2004). These three key elements: *equity*, *responsibility* and *environmental sustainability*, should thus be considered in terms of estimating the level of distributional equity.

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[21]Global equity is defined as degree of fairness in international terms, while intergenerational equity addresses the immediate actions in jurisdictions at the same level (e.g. national, state and local), in terms of reducing greenhouse gas emissions. / IPCC. 2001. Climate Change 2001: Mitigation. URL: <www.grida.no/climate/ipcc_tar/wg3/228.htmS.>. Consulted 12 July 2008

[22] *Intra-country equity provides a national perspective, and has two aspects, namely that national instruments can be examined in terms of *sector* and *social* equity. Sector equity is defined as a level of equity among different national sectors, and social equity is defined as a level of fairness among different groups. For instance, one sector may use only incentive based instruments but the others may focus more on legislative or technical solutions, which should be horizontally equitable. Scrimgeour, F., L.Oxley, and K. Fatai. 2005. 'Reducing carbon emissions? The relative effectiveness of different types of environmental tax: the case of New Zealand'. *Environmental Modelling & Software* 20: 1439–1448.

3.2.3.1.4 Political acceptability

Jaccard *et al* stated that, in terms of evaluating GHG policy effectiveness, some policy analysts prefer to define equity instead of political acceptability. However, the authors also recognise that defining political acceptability makes it much easier to identify the instrument values and effectiveness because elements of the level of equity may be hard to define and may sometimes be invisible. They thus suggested that a way to define the value of political acceptability is essential to ensure whether politicians can find sufficient assistance to implement a policy (Jaccard et al. 2004).

Three major elements are used for the criteria of political acceptability in this thesis, namely: making a global contribution, market ideology and flexibility. Making a global contribution means that each nation should adopt the most responsible action in response to climate change. This signifies that there is a need to consider whether a policy instrument has the ability to achieve such a global commitment (Goulder 2000). Market ideology is another significant aspect of administrative feasibility. Policy makers need to consider appropriate market mechanisms such as imposing penalties, taxes or carbon trading when taking a long term perspective. Market mechanisms theoretically secure cost efficiency of program implementation with fewer economic impacts. Ideally, it depends whether a particular instrument is capable of providing a great deal of economic benefits or of sharing of the cost burden in the most cost-effective way (Goulder 2000). Flexibility is another key element for political acceptability. This allows policy makers to ensure whether a particular instrument is flexibly adapted in cases of compliance policy measures or immediate modification (Konidari et al. 2007). Policies often involve political uncertainties; for instance, politicians sometimes prefer to change the angle to a more effective or efficient way, and might change their direction based on global and political trends (Ulph et al. 2007). Considering the context of these ranges of ideas, this thesis will adopt three key elements for estimating the level of political acceptability, namely, *making a global contribution*, *market ideology* and *flexibility*.

3.2.3.1.5 Administrative feasibility

It is essential to be effective and efficient in terms of implementation. Administrative feasibility pertains to whether the legal, institutional and practical means exist for policy implementation to be effective and cost-effective in particular (De Coninck et al. 2007). This thesis suggests four elements for judging the level of administrative feasibility, including minimising administrative and transaction costs, enforceability, transparency, credibility and practicability.

Minimising administrative and transaction costs is a key element of administrative feasibility. The level of institutional capacity involves planning, negotiation, decision making and a successful implementation system for large projects in regard to climate change. If implementation does not work there may be a complexity of problems and a range of interests and stakeholders involved. Whether these potential shortages can be covered in a timely manner (Ruth 2006), depends on the level of existing experience and social structures associated with similar policies enacted at a national or international level. (De Coninck et al. 2007). It is important to ensure that 'hybrid models' are considered in implementation, which help alternative approaches, create cost effectiveness and are administratively feasible, thus removing complexity (Lars 2006). Moreover, it is important to ensure balanced consideration of economic and environmental benefits, which may result in a high degree of administrative feasibility. Taking more risks with a more alternative approach may be complex, and may result in less feasibility. Sharing responsibility causes less stress on administrative and transaction costs, but may be uncertain if it requires higher cost and more administratively complex issues within environmental policy such as complicated market mechanisms (e.g. tax standard or trading scheme) (De Coninck et al. 2007). Policy makers therefore need to consider a number of elements in order to minimise administrative and transaction costs.

Enforceability is one of the elements in administrative feasibility. Jaccard et al (2007) stated that it is important to ensure the burden of administrative feasibility, in particular, whether enforcement is at an acceptable level. Ensuring a high level of compliance by enforcement may create administrative cost effectiveness (De Coninck et al. 2007). This may also reduce costs burden to further steps of policy implementation (Heller et al. 1974). In order to recognise levels of enforcement, it is essential to look at the rigidity of the implementation framework. Identifying stringency for noncompliance and nonparticipation in each program allows policy makers to assess whether a program has the ability to determine the rigidity of participation; for instance, whether there is any regulation such as penalties, sanctions, and liability used in a program, in order to deter nonparticipation, contributes to achieving the specific program target (Haites et al. 2001). Thus enforceability is an important element in administrative feasibility.

Transparency and credibility are further elements of administrative feasibility. It is also necessary to examine the availability of reporting and monitoring when considering the administrative feasibility of implementation (Jaccard et al 2007). Credibility allows us to determine whether activities of selected instruments are reported consistently in terms of the details of the activities, measurements, collected data for milestones and national compliance efforts. Transparency assesses whether effective feasibility is provided with clear information, including methods of operation and implementation for selected instruments to target groups with openness and with high reliability. Further, the transparency must satisfy the aforementioned matters of necessary, urgent issues (OECD 2003a).

Practicability is another significant element of feasibility; it allows policy makers to assess whether a program has the ability to ensure the further improvement of any aforementioned matters with timely consideration. Possible indicators that can be considered include integration of 'co-operation' and 'co-ordination' between different sections, relevant allocation of responsibilities in the public sector, level of provision for establishing new authorities, modifications to current national legislation frameworks for climate change policy, intervention, timing, management of measurements, control and verification for practicability (OECD 2004).

In summary, five criteria have been adapted in order to examine the effectiveness of instrument activities in terms of reducing GHG emissions, namely the *environmental effectiveness of GHG emissions, cost effectiveness, distributional equity, political acceptability and administrative feasibility.*

3.2.3.2 Categorised policy instruments against selected criteria

The following section will turn to examine the particular characteristics of each of the categorised instruments (*regulatory*; *voluntary/negotiated agreement*; *economic*; *research*; *information based instruments*) against the criteria selected above for instrument analysis in the field of climate change policy. This examination will consider appropriate theoretical instrument analysis and enable estimation of which instruments were used for a particular policy program and its targets.

Each category of instrument will be considered theoretically using a number of key elements of the criteria found in the previous section, namely: *environmental effectiveness for reducing GHG emissions* (achieving goals); *cost effectiveness* (achieving goals with low cost impacts); *distributional equity* (equity, responsibility and environmental sustainability); *political acceptability* (making a global contribution, market ideology and flexibility*)* and *administrative feasibility* (minimising administrative and transaction costs, enforceability, transparency, credibility and practicability). Chart 3.3 below describes a theory-based instrument analysis, which involves the characteristics of each instrument category against the key criteria in regard to reduction of GHG emissions. The following sections will describe the ways of establishing these characteristics for each key criterion.

Chart 3.3: Theoretical Perspectives Used in Relation to Instrument Analysis

	Regulatory	Voluntary agreements	Economic		R&D instruments	Information
			Incentives	*Disincentives*		
Environmental Effectiveness	High	Low	Low	Medium	Medium	High
Cost Effectiveness	Low	High	Low	Medium	Low	High
Distributional Equity	High	Medium/ high	Medium	Medium/high	Low	Medium
Political Acceptability	Medium	Medium/low	High	High	Medium	High
Administrative Feasibility	High	Low	Low	Medium/High	Medium/Low	Medium/High

3.2.3.2.1 Regulatory instruments

Regulatory instruments have a strong influence on emission abatements. These instruments involve integration with an emitter (IPCC 2007b). They also ensure clear disclosure of instrument provision such as reporting, auditing and information provisions (Wheeler 2007). These potentially represent a strong contribution to reducing GHG emissions. They tend to be less cost-effective. Companies tend to incur huge costs dealing with the anti-pollution process (Stavins 1997). It also requires strong government involvement and extra administrative costs such as employment and financial assistance (Howes 2005). In terms of distributional equity, the instruments imposing penalties for emission charges reduce uncertainties for differentiated responsibility of emitters (Haines 2002). Governments use regulatory instruments, which do not focus on public preferences to get results which provide social and environmental equity. These signify that the instrument can be assumed to have a high distributional equity.

Regulatory instruments have a moderate influence on political acceptability. An inflexible mechanism would make a difficult adjustment of the baseline, once the legislation has been passed (Sigman 2007). In general, a weaker market ideology involved in these instruments (Stavins 1997), which may not be politically acceptable, unless an instrument involves an economic device or creation of better goods and services (IPCC 2007b). In terms of administrative feasibility, it requires strong enforceability by involving stakeholders and government which openly engage in policy actions (Goulder 2000), resulting in strong credibility and transparency. The instrument which can deal with a quick solution with the shortest time frame would also be feasible (Parminter 2003). Thus regulatory instruments may have a strong influence on administrative feasibility. However, the instruments can wield less influence, if they do not give sufficient knowledge and involvement to policy actors (Howes 2005), and require additional administrative costs for extra approaches to environmental results (IPCC 2007b).

3.2.3.2.2 Voluntary/negotiated agreement

Voluntary instruments encourage long-term perspectives on changing behaviours towards the responsibilities (Hertin et al. 2004). However, only a few estimations of the actual environmental impact have been made and these have not had much effect (Khanna 2001). An entirely voluntary scheme may not be expected to have a strong effect for reducing GHG emissions (Mörikofer 2001).

Voluntary instruments are in general cost-effective (OECD 2003a). The flexibility intends to reduce environmental responsibilities beyond legal pressures (Hertin et al. 2004). This flexibility creates the cost from an organisation's own choice and requires lower cost requirements (Price 2005 and Phylipsen and Blok 2002). However, this does not mean the instrument achieves its targets as intended, and the economic efficiency of the voluntary approach, in practice, is often lower than policy makers expect (OECD 2004). In terms of the distributional equity, these instruments tend to be less effective. The conservative system for global contributions may cause loss of opportunities in global competition (Hertin et al. 2004); and the flexible mechanism tends to avoid equity, due to companies' preference for an adaptation process and costs (Braathen 2005). The result for a non-compulsory form may also be a lack of stringency towards a polluter's responsibilities (David 2005).

In terms of their political acceptability, voluntary instruments may not be politically acceptable due to the lack of global contribution and market mechanisms for reducing GHG emissions. A flexible mechanism involves voluntary instruments which tend to have conservative forms with a non-binding basis (Hertin et al. 2004).The flexibility also allows emitters to select favourable options for their environmental actions (Carraro et al. 1999). In practice, the instrument tends to incorporate actions with stakeholders who aim to achieve environmental outcomes at their desired level of restrictions (Darnall et al. 2003). Voluntary instruments have, in general, less administrative feasibility. They are low in administrative and transaction costs (Price 2005; Phylipsen and Blok 2002). However, there is less transparency and credibility, enforceability and practicability in the absence of government involvement and strict monitoring systems (Hertin et al. 2004), although the action depends on the level of restriction imposed by the agreements (Annandale et al. 2004).

3.2.3.2.3 Economic Instruments (Incentives and disincentives)

Incentives

Incentives may be less environmentally effective. Incentives are financial support for provision and dissemination of energy efficiency. Achieving program goals tends to focus more on financial support and compensation for the public and emitters than on the degree of productivity (IPCC 2007b). Incentives may be cost-ineffective. In general, these types of fiscal instruments are regarded as costly instruments. In particular, government must invest a large amount of money in the long term as the private sector expects the continuation of financial support. (IPCC 2007b). Incentives have a strong distributional equity. Equitably allocating financial support from governments improves practice in climate change targets (IPCC 2007b). A low interest loan allows government financial support for individual emitters or members of the public who cannot undertake the targeted implementations otherwise (IPCC 2007b). This represents a long term perspective with high sustainability. In general, incentives are politically acceptable. Policy makers often utilise incentives to modify critical financial issues in market failure and social equity. The basis for government involvement via such instruments also helps enable industries or the public to afford knowledge and skills development (Damton et al. 2007). These represent a flexible mechanism involved in the instruments. However, in general, incentives are not capable of supplying market ideology (Enzensberger, et al. 2002). Incentives may be less administratively feasible. High administrative and transaction costs are required for implementation by government for a long term perspective (IPCC 2007b). Moreover, the instruments are, in general, not capable of any enforceability unless mixed with other instruments (Damton et al. 2007). These may not have practicability because policy makers tend to keep relying on them (IPCC 2007b).

Disincentives

Tax and trading systems are intended to change the social behaviour of emitters and governments (IPCC 2001), to reduce GHGs emission provisions (Bruvoll and Larsen 2004). These systems are also expected to cover either emissions from a few sectors of the economy or those from virtually the entire economy. Therefore, they can be very effective (IPCC 2007b). However, achieving these goals may depend on social, economic and political effects.

Tax and trading systems can be cost-effective. Market devices help to provide low financial pressures in terms of the approaches to the reduction of GHG emission at global level (Ekins and Dresner 2004), although these tend to focus more on incentives than revenue (Barde 1994). Disincentives may have strong distributional equity. The instruments give the most rational responsibilities to emitters by the polluter pays principle (Ekins and Dresner 2004). Trading systems may be less equitable than taxes for cost and household equity (Goulder and Parry 2008). Both instruments are also capable of having a market device, which meets demands for economic, environmental and social aspects with a long term vision (Okinomou and Jepma 2007). Moreover, taxes and trading systems are politically feasible. Frequent imposition of charges is politically acceptable but may have an insufficient effect on behaviour change (Damton et al. 2007). However, the basis for the market ideology is highly practical, comprehensive, and politically favourable (Sigman 2007). The instruments provide possible openings into global participation of international market systems (Ekins and Dresner 2004), which gives a global contribution. Both tax and tradable systems may be administratively feasible. The instruments often involve a market device to help lower administrative and transaction costs (Sigman 2007). Furthermore, enforceability and transparency may exist in the frameworks, such as emitters imposed upon if they do not meet their targets (IPCC 2007b).

3.2.3.2.4 R & D Instruments

R&D instruments may moderately influence reduction of GHG emissions. These are very significant tools in order to transform a fossil energy society to a non fossil energy society (IPCC 2007b). However, achieving targets depends on the level of governmental support such as incentives, training and auditing (CBO 2005). These instruments may be costly because of extensive facilitation, and the benefits should be anticipated to take two to three decades (Anderson and Bird 1992). An absence of government support would generally create the most expensive approaches. However, achieving goals at the least cost depends on the level of governmental support (Fisher and Newell 2004). In terms of the distributional equity, R&D instruments may be less effective, due to their unpredictability and non-sustainability, because of uncertainties for climate change policy and political and global trends (Ulph et al. 2007). Consistency of long-term government policy may thus not be sustainable.

R&D instruments may have strong political acceptability. The instrument often involves other nations or emitters to communicate about the development and participate in global competition based on market device (IPCC 2007b), which is a global contribution. Furthermore, utility of instruments generally requires strong government support; where politicians often choose their favoured action with the flexible systems (Ulph et al. 2007). On the other hand, R&D instruments may have less administrative feasibility in general. The extensive facilitation involved the instruments with a long term perspective (Fritsche and Lukas, 2001; Sakakibara, 2001; Ekboir, 2003; Justice and Philibert, 2005) and non immediate benefits (Anderson and Bird 1992). Expensive facility with a continuous cost burden causes a high cost for the administrative and transaction process (Fritsche and Lukas, 2001; Sakakibara, 2001; Ekboir, 2003; Justice and Philibert, 2005). Transparency, credibility, and enforceability will depend on the level of government support.

3.2.3.2.5 Information-based Instruments (i.e. information and education)

Information-based instruments may result in a reduction in future GHG emissions by operating at an ideological level. These aim to make an indirect contribution to reduction of GHG emissions by improving awareness and collaboration of industry in relation to climate change issues (IPCC 2007b). Achieving their goals may depend on governmental support, and social and political trends. On the other hand, these instruments may be cost-effective. Costs depend on the level of information required by a policy (Beierle 2003). These can be very cost-effective, if information requires less cost burden (IPCC 2007b). In terms of distributional equity, they may have a moderate influence. The instrument may also require individual emitters to disclose a certain level of information for social equity. However, some emitters prefer to limit their information provisions, thus the equity can be different according to the level of cooperation (IPCC 2007b) Furthermore, the primary targets of changing social behaviour in order to gain environmental outcomes in the long term (OECD 2001b), may be sustainable.

Information-based instruments may have a strong political acceptability. The instrument often involves a market ideology by providing environmentally friendly products, sharing knowledge of activities, having market competition, given opportunities to be involved in global participation (Okinomou and Jepma 2007), which provide a strong global contribution. They also tend to require free adaptation of information, meeting emitters' preferences, and a lower cost basis (Kennedy et al. 1994), which may represent flexibility. In terms of administrative feasibility, they may be highly effective. The basis for government involvement may involve high transparency, credibility and practicability of policy implementation. However, it all depends on the level of restrictions by governments (OECD 2003a). In general, there can be low administrative and transaction costs (Pierre and Peters). However, results in practice will depend on the degree of restrictions to the public and firms levelled by the instrument that result in cooperation (Beierle 2003).

Given these aspects, this section has presented the method for theoretical instrument analysis for the instrument design in terms of GHG emission reduction. The following section will describe a method for *evaluation of actual effectiveness* in the SIA approach.

3.2.4 Evaluation of Actual Effectiveness

Evaluation of actual effectiveness is the fourth stage of the SIA approach for examining the effectiveness of 'soft' and 'hard' instruments in climate change policy.

As mentioned in the previous chapter, the four priorities for instrument analysis in climate change policy include: i) *instrument design*; ii) *successful GHG mitigation*; iii) *program achievement*; and iv) *economic efficiency*. In terms of identifying the instrument activities to reduce GHG emissions, this thesis concluded that program achievement, that is reaching the targets with cost effectiveness and instrument interventions, may represent successful GHG mitigation.

This section is intended to help identify a way of defining whether instrument activities under particular policy programs were successfully conducted. This section describes a method by which the selected instruments influenced actual results by examining five criteria: *environmental effectiveness*; *cost effectiveness*; *distributional equity*; *political acceptability*; and *administrative acceptability*. It is important that there are first and second priorities within these criteria. The first criteria can be environmental effectiveness and cost effectiveness. The second priorities are distributional equity, political acceptability and administrative acceptability.

Firstly, this section will describe how these second priorities are examined for the instrument intervention. It will then present ways of identifying results for the highest priority criteria, consider program evaluation approaches and describe methods for each criterion (i.e. environmental effectiveness and cost effectiveness). Finally, this section will conclude with the methods for evaluation of actual effectiveness.

3.2.4.1 Distributional Equity, Political Acceptability and Administrative Feasibility

The priorities for climate change policy typically recognise that successful GHG mitigation requires the achievements of individual policy programs in a cost effective manner. In the meantime, there is also a need to analyse the effectiveness of instrument design in terms of political and administrative concerns. These criteria of distributional equity, political acceptability and administrative feasibility, will thus be critically evaluated. The method adapts key indicators for each of these criteria, which have already been identified in the section on *analysis of instrument design*. These indicators will be examined in terms of the effectiveness of instrument design in practical terms. Chart 3.4 describes the key indicators for evaluating the effectiveness of instrument activities, especially for *distributional equity, political acceptability* and *administrative feasibility*.

Chart 3.4: Key Indicators for the Criteria: *Distributional Equity*, *Political Acceptability* and *Administrative Feasibility*.

Criteria	Elements	Indicators
Distributional Equity	Equity	Does the framework provide a level of equity?
	Responsibility	Does the framework provide stringency to emitters? (e.g. penalties or carbon tax etc).
	Sustainability	Is the framework sustainable?
Political Acceptability	Reaching Global Contribution	Is the framework capable of accessing global participation?
	Market ideology	Do market mechanisms exist?
	Flexibility	Is the framework flexible? (e.g. adapting or adjusting time and structure).
Administrative Feasibility	Minimising Administrative and Transaction costs	Does the framework provide minimum impacts on administrative and transaction costs? (e.g. technological innovation or adaptation; considering impact from price standard/convention; sharing responsibility with other sectors; and avoidance of any complexity)
	Enforceability	Does the framework provide any enforceability for compliance? (e.g. penalty for noncompliance or meeting targets)
	Transparency and Credibility	Is there consistency of reporting commitment, a reporting or reviewing system, and identification of issues during implementation?
	Practicability	Is the framework capable of addressing issues immediately, and committing to rectify?

3.2.4.2 Program evaluation approach and Vedung's approach

Three criteria: distributional equity, political acceptability and administrative feasibility, are important factors but in order to most accurately examine the effectiveness of climate change policy instruments, we must look at 'goal attainment' and 'cost effectiveness'. The following section will present ways of examining the actual effectiveness of *environmental effectiveness for reducing GHG emissions* and *cost effectiveness*.

With respect to identifying methods for *environmental effectiveness for reducing GHG emissions* and *cost effectiveness*, the two priorities may be key elements (i.e. *program achievement* and *economic efficiency*). These priorities recognise that successful GHG mitigation requires the achievements of individual policy programs developed in an effective manner. A number of program evaluations[23] can be addressed, as by McNamara (1999), House (1983), Guba and Lincoln (1981) and Scriven (1993). All have influenced the categorisation of program evaluation approaches, especially of goal based evaluation and cost effectiveness. A variety of existing program evaluations is available in the field of political science, however, not many evaluations have been identified as a specific focus on policy instruments. Evart Vedung's (2005) description is focused on the effectiveness of policy instruments by program evaluation with more substantive models than procedural ones. The former describe government interventions resulting in a 'means to an end'. This may be most appropriate here because this thesis focuses in particular on government initiatives and contributions to Greenhouse Policy at the national level in Australia. More specifically, Vedung's 'goal attainment model' focuses on an examination of whether an instrument has 'succeeded or failed', rather than on the side effects of implementation. The 'cost-effective approach' emphasises estimating the cost effectiveness of a program achievement by measuring the value of program effects in physical terms. The following section will describe the details of the method used for examining *environmental effectiveness of reducing GHG emissions.*

3.2.4.2.1 Criteria for Environmental Effectiveness for Reduction of GHG Emissions

In order to analyse effectiveness of GHG mitigation, this thesis adapts a method from Vedung's 'goal attainment model'. This model is based on a concept of 'before versus after comparisons', which simply identify specific target outcomes in a particular jurisdiction at different times, once before the program was conducted and again at some time after. The model is also very useful for understanding program impacts and achievements as they are intended, but it is difficult to isolate other social impacts that may also have had an influence at the same time (Dye 2008). The approach firstly needs to identify performance indicators before implementation against targets at the end of the period. It will then examine how the performance indicators are met against

[23] Carter McNamara (2002) suggests *goal-based evaluation, process evaluation and outcome evaluation.* Another classification from House (1983) focused on individual evaluation approaches with six categories: *objectives-oriented approaches, management-oriented approaches, consumer-oriented approaches, expertise-oriented approaches, adversary-oriented approaches and participant-oriented approaches.* Numerous program evaluation typologies exist not only in the field of political science but also other fields, including Guba and Lincoln (1981),and Scriven (1993).

their intended targets (Vedung 2008). The result will then show the level of goal attainments, which represents the level of environmental effectiveness in terms of reducing GHG emissions. The following section, will describe the details of the method use for examining the criteria for *cost effectiveness.*

3.2.4.2.2 Criteria for Cost effectiveness

Cost effectiveness allows us to identify whether the instrument selection can achieve a particular program goal with the lowest costs or by meeting the decided costs including costs for administration and implementation of the policy, in terms of reducing GHG emissions (IPCC 2007b). Cost effectiveness analysis does not require identifying values of costs and benefits but revealing the effectiveness of a policy program whether it achieves its intended goals of financing the program or not (Livin 1975). Vedung's cost effectiveness model (2008) forms a simple algorithm to measure the degree of cost effectiveness which is described below.

$$\text{Cost effectiveness (program efficiency)} = \frac{\text{program effects in physical terms}}{\text{Costs (e.g. AUD)}}$$

Adapted from Vedung (2007)

The initial intended goals of a program divided by the committed original expenditure gives an ideal productivity at minimal cost. Thus if the original expenditure was extended after the program was implemented and it did not achieve its targets, the result would be low effective productivity. On the other hand, if there was less expenditure than the committed costs applied to the implementation and if it achieved its targets, then the program would show more efficient cost effectiveness (Vedung 2008). Therefore, in terms of evaluating the criteria for environmental effectiveness for reducing GHGs, the approach was derived from Vedung's 'goal attainment'. The criteria for cost effectiveness were also derived from his 'cost effectiveness approach' for evaluation of actual effectiveness. A limitation of this approach is its narrow interpretation of costs for example in debt considering the cost of failing to reduce emissions.

The evidence of this section presented the methods for an evaluation of actual effectiveness. The following section will describe a method for *discussion* in the SIA approach.

3.2.5 Discussion

Discussion is the fifth stage of the SIA approach. The 'discussion' stage aims at reflecting on all the results from each stage of the instrument analysis applied to the effectiveness of 'soft' or 'hard' instruments in climate change policy, following *descriptive perspective*, *transformative perspective*, *analysis of instrument design* and *actual effectiveness*. Having now identified these five stages of the SIA evaluation, the following section will summarise the second section of this chapter, which detailed Effectiveness Analysis/ Method for evaluating effectiveness of 'soft' and 'hard' instruments in climate policy.

In terms of applying the Identification & Trend Analysis/ Method and Effectiveness Analysis/ Method for the examination of the influence of 'soft' and 'hard' instruments in the case of Australia during the period 1997-2007, The Identification of Trend Analysis allows policy makers to determine a simple and clear classification of the level of coercion between 'soft' and 'hard' instruments. It may also help policy makers to address the extent of governmental control during a certain period of time. The Effectiveness Analysis, which allows policy makers to identify strengths and weaknesses of instrument design by government in terms of urgent action in order to reduce GHG emissions. Thus, these methods are very significant evaluative methods for evaluating climate change policy activities.

With regard to the empirical case study of this thesis, the data collection used for applying the methods are based on national communication reports from 2002 and 2005 by the Australian Government to the UN. This thesis has addressed the fifty-two policy instruments during the given period. However, there is a difficulty of finding an entire relevant instrument list to be used for the data collection, due to limitations in the availability of the data in national reports and inconsistency in the instruments used. The Howard government [1997-2007], provided only three national communication reports, in 1997[24], 2002 and 2005. Each report listed a number of initiatives and described their implementation but some were incomplete and others were never actually implemented during the period. Thus the process of data collection presented some difficulties for this analysis. Although limited interviews were conducted concurrently, by the researcher and meetings were held with several relevant bureaucrats in the federal government, these were for clarification purposes only. These meetings provided useful advice and material, such as additional measures not included in the communication reports up to 2007, to supplement the data collection to some extent.

3.2.6 Summary

This section has presented the second part of this current chapter. It has developed Effectiveness Analysis/ Method for examining the effectiveness of 'soft' and 'hard' instruments in climate policy. In terms of developing Effectiveness Analysis/ Method, this thesis has adapted the SIA approach with five stages and details of each stage which were described in this section: *descriptive perspective*; *transformative perspective*; *analysis of instrument design*; *evaluation of actual effectiveness* and *discussion*. Each stage evaluates a different aspect of influence of a particular policy instrument in order to achieve successful GHG mitigation. The SIA has thus been developed in this thesis, as a simple but the most fundamental and relevant method, in order to evaluate the effectiveness of the 'soft' and 'hard' instruments.

The following section will conclude, having presented the methods for the Identification & Trend Analysis/ Method to identify trend use of soft and hard instruments in climate change policy; and for the Effectiveness Analysis/Method to examine the effectiveness of 'soft' and 'hard' instruments in a policy which contributes to reducing GHG emissions in a nation.

[24] Although this thesis has recognised one of the national communication reports provided by the Howard government [1997-2007], the 1997 report did not include Howard's new National Greenhouse Strategy, which was expected to finalise mid 1998. Thus, the data collection used for the empirical case study is based on national communication reports in 2002 and 2005 to the UN which particularly illustrated the Howard initiatives during his regime between 1997 and 2007.

3.3 Conclusion

This chapter develops the two methods selected in Chapter Three, namely: the Identification & Trend Analysis/ Method to identify trend use of soft and hard climate policy instruments; and the Effectiveness Analysis/ Method to examine the effectiveness of 'soft' and 'hard' instruments in a policy which contributes to reducing GHG emissions in a nation.

In terms of the Identification & Trend Analysis/ Method, this thesis has developed and adapted two approaches, namely: CCPIC and DSHCI. In terms of classifying climate policy instruments, this thesis has adapted the CCPIC with six instrument categories (regulatory, voluntary/voluntary agreement, economic, research, information-based and mixed instruments). With regard to distinguishing between 'soft' and 'hard' instruments in climate change policy, this thesis concludes with the DSHCI with 17 criteria, which focus on the level of instrument dominances under the instrument designs of a national government in terms of reducing GHG emissions. These approaches allow us to illustrate how a government allocates its adoption of 'soft' and 'hard' climate change policy instruments during the design period of a climate change policy.

The Effectiveness Analysis/ Identification & Trend Analysis/ Methods examine the effectiveness of 'soft' and 'hard' instruments in a policy which contributes to reducing GHG emissions in a nation. This thesis has utilised the SIA approach for examining the effectiveness of 'soft' and 'hard' instruments in reducing GHG emissions with five stages: *descriptive perspective*, *transformative perspective*, *analysis of instrument design*, *evaluation of actual effectiveness* and *discussion.* Each stage evaluates a different aspect of influence of a particular policy instrument in order to achieve successful GHG mitigation. This approach also allows us to utilise a simple but the most fundamental and relevant method, in order to evaluate the effectiveness of the 'soft' and 'hard' instruments.

The results in this chapter further extended the findings from Chapter Two and have thus fulfilled the first aim of this overall thesis to develop methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions.

The following chapter will demonstrate the background and significance of Australia's Greenhouse Policy, especially during the period 1997-2007, before conducting an analysis of the effectiveness of 'soft' and 'hard' instruments in the case study. This will describe: the background of national circumstance and historical policy development; and the significance for policy instrument activities. It will be very important in terms of analysing national policy activities and a clear understanding of critical aspects of a particular nation regarding 'soft' and 'hard' instrument analysis in climate change policy.

From the next chapter, this thesis moves onto a fulfilment of the second aim of this overall thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim.

Chapter Four will explore the development of Australia's climate policy as an empirical case study. This Chapter will present the need to consider the effectiveness of the policy in the chosen period of 1997-2007, such as the rapid growth in GHG emissions and the voluntary-based initiatives. Australia's domestic climate policy of this era reflects one of the most critical periods in terms of GHG mitigation policy by one of the most carbon intensive nations. This Chapter will also address the unique circumstances in Australia, including, the rapid population growth and land use patterns, and the dominance of economic resources by large energy intensive and carbon intensive manufacturing and products. These findings are essential context for the following case studies in order to address and appreciate background and significance.

Chapter Four
Australian Climate Policy, 1997-2007

4.0 Introduction

This thesis now explores an empirical case study. The aim of this study is to fulfil the second aim of the overall thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim. In order to achieve this objective, climate policy in Australia during 1997-2007 is discussed in considerable detail, given that the Australian government emphasised largely voluntary-based instruments in response to global GHG mitigating activities, while increasing national emission trends and continuing not to ratify the Kyoto Protocol.

In Australia, critical concern was experienced for the period 1997-2007 about effective instrument allocation and choice by the national government when the rest of the world was demanding strong initiatives from developed nations to immediately implement actions to reduce greenhouse gases. However, one of the major criticisms that has emerged of Australian government initiatives is whether the voluntary-based instruments actually encourage domestic action to reduce GHG emissions (CWLTH 2000b; Hon *et al.* 2002; Curran 2003; ANAO 2004; Hunt 2004; Christoff 2005; Sullivan 2007 and Crowley 2007). Thus, the influences of 'soft' and 'hard' instruments are a critical question in Australia.

Policy analysis integrated with 'soft' and 'hard' instrument analysis on climate change policy is a central issue in this thesis. So, this thesis will critically reflect on its case study in order to demonstrate in subsequent chapters how the 'soft' and 'hard' instruments adopted by the government influenced reduction of GHGs during this period. The results of considering this significance for instrument analysis theory, will allow policy makers to develop ideas for further discussion about the possible effects of the 'soft' and 'hard' instruments for climate change policy, not only applied to Australia but also other nations.

The purpose of this chapter is to present the background and significance of the implementation of Australian greenhouse policy at the national level over the period 1997 to 2007. This chapter is very important in terms of analysing national policy activities and a clear understanding of critical aspects of a particular nation regarding 'soft' and 'hard' instrument analysis in climate change policy. The case study including the details in this chapter and analysis in subsequent chapters helps fulfil the second aim of this overall thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions.

The chapter is divided into four major areas, including national circumstances, emission records, the history of Australian climate change policy; and critiques of instruments and the policy in Australia. It covers each of these four aspects. It then concludes with the background to, and significance of, national initiatives under the Australian greenhouse policy during the above period before analysing the case study in following chapters.

4.1 National Circumstances

4.1.1 Introduction

The purpose of this section is to describe the national circumstances of Australia in the context of climate change policy development over the period 1997-2007. In order to examine these circumstances, the section will examine a number of key aspects of national circumstance including: government structure; population profile; geographic profile; climate profile; economic profile; energy; transportation; industry; waste; agriculture and forestry. Selection of these key circumstances is based on the UNFCCC [United Nations Framework Convention on Climate Change] guidelines. A clear picture of each key aspect will be presented through an examination of data based on Australia's national communication reports to the UNFCCC. The section will conclude with a clear description of the national circumstances in Australia during the above period.

4.1.2 The UNFCCC guidelines

The UNFCCC identified that all parties here have 'common but differentiated' responsibility for dealing with climate change issues. International agreement on climate change requires that national responses meet the particular circumstances of each nation (CWLTH 1997). In 1999, the UNFCCC's guidelines recommended all parties should provide details of the various key circumstances of their nations including: relations between their circumstances and GHG emission impacts, how these events are changed by the impacts; and how these circumstances are changed by the impacts; and any possible information related to national circumstances and historic trend. Individual headings for the description of national circumstances under the guidelines: government structure; population profile; geographic profile; climate profile; economic profile; energy; transportation; industry; waste; building stock and urban structure; agriculture; forestry and other circumstances (if applicable) (UNFCCC 2000).

The aspects classified by the UNFCCC as 'other circumstances' have not been clearly recognised in the Australian national communication reports. This chapter will follow these UNFCCC's guideline headings except for this one aspect, in terms of identifying the national circumstances in Australia in regard to climate change policy over the period 1997 to 2007. This section will demonstrate the national circumstances in the following order:

- Government structure
- Population profile
- Geographic profile
- Climate profile
- Economic profile
- Energy
- Transportation
- Industry
- Waste
- Building stock & urban structure

- Agriculture
- Forestry

4.1.3 Government structure

In terms of government structure in Australia, it is necessary to identify Australia's unique political system. The constitution was established for the operation of the Federal Parliament in 1901. The Prime Minister is designated to lead the Commonwealth Government, which includes Ministers who have responsibility for particular issues in federal activities (CWLTH 1997). In the structure of the national constitution, the government involves eight states and territories, namely: the Australian Capital Territory, New South Wales, the Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia. Within these jurisdictions, there are more than 700 local governments. In terms of acting on climate change matters such as emissions reduction, environmental protection and developments, all the Australian Government, state and local jurisdictions are required to share the responsibility, and are designated to promote effective implementation efforts for climate change policy (AGO 2005). With respect to the implications of greenhouse activities in the constitutional system, a number of significant issues are often recognised due to the allocation of responsibilities to the states and local governments. Under the policy, the Commonwealth plays a role in national leadership and must take responsibility for consideration of international negotiations (CWLTH 1997). Beside the governmental systems, the country has recently found significant impacts from climate change, and one of these effects is due to the rapid population growth each year for the last three decades in Australia.

4.1.4 Population profile

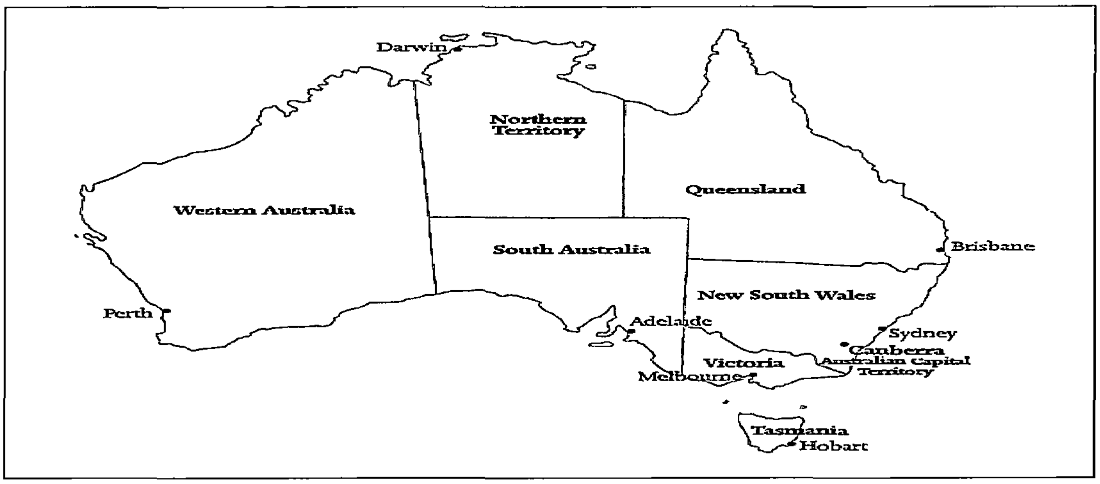
The population in Australia is still relatively small compared to other nations. However, rapid population growth has been identified as a significant aspect of this country. In particular, comparison with the rates of other OECD countries shows the population rose by 64.3% from 1960 to 1990. On the other hand, European Union [EU] member states' increase was only 15.8% over time (CWLTH 1997). In the years

1990-2003, it was reported that the proportion of the population rise in Australia was 17.1%. The population in this country reached over 20 million in December 2003. Projections for 1990-2021 show a similar change, expecting a growth of 36.8%. This will create a severe situation with pressure on resources and energy consumption in the future. Moreover, most of the population in Australia is settled in two separated coastal regions, basically located in the south-east and east. In both coastal regions, the population is focused in urban central areas, especially in the state and territory capital cities. 82% of the population occupies 1% of the continent (AGO 2005). The high growth rate and spatial density of the Australian population will necessarily increase demands for resources and energy, which will, in turn, increase the likelihood of significant emissions growth.

4.1.5 Geographic profile

Australia's geographical background is also unique. The most significant feature of the geography in Australia can be discussed in relation to its geographical environment. In particular, features such as the unique geography and environment and the wealth of natural resources are bound up with climate change issues. Australia is the lowest and flattest (except Antarctica), of the world's continents, with the low humidity, and is the sixth largest country in the world (7,692,024 km^2). Furthermore, a large area of the continent (from approximately 10° south to 43° south of the equator, including the island state of Tasmania) is desert, which results in most people living in coastal areas with long distances separating urban areas (AGO. 2005). These unique geographical circumstances increase the rate of transport related GHG emissions.

Figure 4.1: Geographic map of Australia



Adapted from CWLTH [Commonwealth of Australia]. 1997. *Australia's Second National Report under the United Nations Framework Convention on Climate Change*. Canberra: Australia

4.1.6 Climate profile

Australian average temperatures have been estimated to rise by 0.6 to 1.5 °C by 2030. If global GHG emissions are continuously increased in this world, it may be projected the range of 2.2 to 5.0 °C by 2070. Warming is projected to be lower near the coast and in Tasmania and higher in central and northwestern Australia. During the period 1981-2000, rates of rainfall are likely decreased overtime, in such areas as southern parts of Australia during winter, southern and eastern parts during spring, and south-west Western Australia during autumn. An increase in the number of dry days has been expected across the country; however, it is likely that there will be an increase in intense rainfall events in many areas (CSIRO 2010).

There is greater than 90% certainty that increases in greenhouse gas emissions have caused most of the global warming since the mid-20th century and such emissions have been the result of human activities. CSIRO research has addressed the fact that higher GHG levels are likely to have caused about half of the winter rainfall reduction in south-west Western Australia (CSIRO 2010). The information above indicates significant influences of the climate change on the country.

4.1.7 Economic profile

The economic structure of Australia is a relatively closely associated product of history and geography, particularly of Australia's abundant natural resources. Australia recorded an economic growth of AUD 821 billion in 2004. This represents the fourteenth largest world economy in terms of gross domestic product [GDP] (AGO 2005).

But there are significant differences in Australia's economic circumstance from other Annex I parties. These are the dramatic increase in population; the vast distances separating urban areas and also the greater distance from other countries; relatively stable patterns of land usage with significant recent changes; and the production and trading of natural resources (fossil fuels and mineral products) taking a significant role in the economy. For example, in comparison with most other OECD countries, Australia is a significant energy exporter, with nearly 68% of its total energy production exported in 2003-2004 (excluding uranium) (AGO 2005), which is critically significant to climate policy. The economic structure of Australia has a major exacerbating impact on its GHG emissions profile, and creates unavoidable problems for reducing emissions. Australia exports primary products that are both energy related and energy intensive goods. In particular, with respect to the energy intensive and export oriented industries, there are significant contributions to economic factors from: aluminium smelting, alumina reefing, liquefied natural gas (LNG), and coal and steel production. These have resulted in Australia's becoming one of the highest energy exporters in the world (AGO 2005).

With respect to international trade affairs, Australia has strong trading connections (agriculture, minerals and energy) with developing countries, especially in the Asia-Pacific region. Australia's exports have been well developed at around 7-8% per annum, with those to East Asia growing at an even faster rate. There is nowhere else among the OECD countries, which has this unique concentration of emission-intensive goods in its exports (AGO 2005). These signify that Australia's economic profile is highly related to energy intensive trades domestically and internationally, which contribute to a global GHG emission provision.

4.1.8 Energy

Energy intensity is another important factor for climate change issues in Australia. Australia's emissions profile is highly dominated by the large energy intensive industries, such as aluminium, iron and steel production, and carbon intensive products. In terms of trading, there is also a wide dispersal of natural resources and remoteness from overseas markets: Australia's industry and consumers also rely on long distance transport. Australia has encountered high risk in terms of continued economic growth from its dependence on fossil fuel intensity, with national emissions intensity also declining compared to its total economic balance (AGO 2005).

With respect to a high dependence on fossil fuels as an economic device, the country is far more dependent on fossil fuels than any other OECD country due to the low cost of the resource, the abundance of the resource and limited hydro-electric resources (resulting from Australia being one of the world's most arid countries). However, the country does not accept nuclear power. Given this background, Australia's CO_2 emissions per unit of energy generated are double the OECD average. Similarly, fossil fuels account for nearly 94% of Australia's energy inputs with this far greater reliance on fossil fuels than for any other OECD country (AGO 2005).

There is a high demand for energy consumption. In 2003–04 total energy use in Australia, comprising both primary and derived energy, was 5,346 PJ[25], of which around two-thirds (3,545 PJ) was delivered to end-users (households, commercial activities, transport and industry) and the remaining one-third was lost in conversion processes, transmission and distribution (AGO 2005). The chart below shows Australian energy supply, trade and consumption, by fuel in energy units, 2003-2004.

[25] petajoules (10^{15} joules); AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change.* The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Table 4.1: Australian energy supply, trade and consumption by fuel in energy units, 2003-2004

Table 2.1 Australian energy supply, trade and consumption, by fuel in energy units (petajoules), actual 2003–04

Energy product	Production 2003–04	Consumption 2003–04	Net exports 2003–04
Black coal[1]	7,615	1,558	6,208[5]
Brown coal[2]	659	696	0
Renewable[3]	265	265	0
Petroleum[4]	1,154	1,789	–394
Natural gas	1,468	1,038	431
Total	**11,160**	**5,346**	**6,245**

Notes

[1] Includes coke and coal by-products.

[2] Includes brown coal briquettes.

[3] Includes wood, wood waste, bagasse, hydro-electricity and solar.

[4] Includes crude oil, condensate and LPG. Consumption refers to petroleum products. Exports include refined petroleum products.

[5] Consumption amount may vary from Production — Exports + Imports because of stock change and statistical discrepancies.

Source: Donaldson K *Australian Energy Statistics 2005*, ABARE, Canberra.

Adapted from AGO [The Australian Greenhouse Office]. 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia

The high demand for energy consumption requires more electricity in the country. The electricity generation sector was the largest energy consumer in 2003–04, at 1,629 PJ, as one of the fastest growing sectors. In 2003–2004, 77% of electricity was generated by black and brown coal and their by-products, with limited energy sources from renewable energy, such as hydroelectricity, wind, solar, biogases (e.g., sugarcane residue). As for renewable energy, it currently contributes only 5% of Australia's total energy supply, and represents 8% of Australia's electricity generation. (AGO 2005)

In terms of a national energy market, The National Electricity Market (NEM)[26] was established: a domestic energy market system to make a domestic energy trading common pool. Furthermore, Australia is a significant energy exporter in comparison with most other OECD countries. It was reported that nearly 68% of the total energy provision (excluding uranium) was exported, which represents about one fifth of Australia's total merchandise export earnings over the 2003-04 period. However, most energy products are highly dominant in fossil fuels such as crude oil and

[26]The National Electricity Market (NEM) was established in 1998, and currently offers electricity to around 7.7 million customers in Australia in conjunction with a number of national links including Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia, and Tasmania. The NEM is interconnected with a common pool, or spot market, for trading wholesale electricity products. All electricity supplied by market generators must be traded through the pool. Energy market reform and a reduction in surplus coal-fired capacity have been considered, for the medium to long-term. Future additions to capacity are expected to come from a mixture of coal, cogeneration, gas and renewable sources (AGO 2005).

uranium, petroleum and coal products. (AGO 2005) Given these, there is a high demand for energy and carbon intensive products in Australia, due to the high dependence on fossil fuels; the high demand for energy consumption; the extensive energy trades with other countries. These results in Australia provide a huge contribution to the GHG emission provision.

4.1.9 Transport

Transport is a large part of the domestic economy. It consists of travel, with increasing numbers of people participating, in terms of its geographic size and dispersed population, as well as commercial travel to manufacturing and market centres, and over great distances. As mentioned previously, Australia's population is highly concentrated around its coastal cities, particularly its coastal state and territory capitals. Long distances between the cities are linked by road; Brisbane is 982 km north of Sydney, which is 872 km by road from Melbourne. Adelaide is another 731 km from Melbourne, and road transport form Adelaide to Perth requires a trip of approximately 2,781km, while Adelaide to Darwin is 3,020 km. Hobart is separated from other capitals by both distance and the waters of Bass Strait (AGO 2005). Such long distances between population centres create a critical demand for expansive transportation systems (i.e. a high dominance of domestic travel by flights, private vehicle use, and trading commodities by coastal ships and railways), which then significantly contribute to the output of emissions.

4.1.10 Industry

Australia's economy is highly dominated by its industry trades. These accounted for about 74% (electricity, gas and water provision) of GDP in 2003-2004. Manufacturing produced 11 % of gross value added (GVA), mining produced 4% and agriculture, forestry and fishing supplied nearly 3%. It was reported that additional gross value provided by the services sector was over 50% higher in 2002 than in 1990. GVA from the more energy-intensive manufacturing sector was about 20% higher than in 1990. Short profiles of key Australian industries shows these industries are a relatively significant part of both energy and greenhouse gas intensity, including mineral resources, the aluminium industry, the automotive industry, the chemicals and plastics industry, the wood, pulp and paper industry and the heavy engineering industry. Furthermore, Australia is acknowledged as one of the leaders of the mining industry in the world[27]. The Australian mining and mineral industry (excluding petroleum) represented around 23% of Australia's total exports of goods and services in 2003-2004. Moreover, mining is also the second largest export earner (after manufacturing), accounting for 29.6% of the total value of exports in 2003-2004, principally from the coal, oil and gas extraction industries. The mining industry had increasing GDP records of around 5% over the past 10 years (AGO 2005). Thus Australia's industries are highly dominated by energy and greenhouse gas intensive trades, which results in Australia being one of the most carbon intensive countries in the world.

4.1.11 Waste

With respect to waste, around 21 million tonnes of waste per annum enter landfills in Australia. This waste comprises 35% municipal solid waste (including household waste), 38% construction and demolition waste, and 27% commercial and industrial waste. Some 95% of Australian households recycle waste with over 70% of paper and cardboard, including around 70% of newspapers (over 1 billion newspapers), 63% of aluminium cans (2 billion), 29.8% of glass packaging and 44% of steel cans recycled each year. Over 100,000 people are employed by recycling related industries, supplying the recycling of millions of tonnes of steel annually, which provides energy savings to the Australian steel industry.

4.1.12 Building stock and urban structure

[27]The mineral resources in the nation consists of lead (25%), mineral sands (ilmenite (33%), rutile (43%) and zircon (42%)), nickel (36.3%), tantalum (94%), uranium (39%) and zinc (17%), while Australia's production of bauxite, black coal, copper, gold, lithium, manganese ore, niobium, silver and industrial diamond was in the top six worldwide in 2003. It is the largest provider of mineral sands and lead in the world and also the biggest traders for iron ore, nickel, uranium and zinc, contributing respectively18%, 14%, 21% and 17% of world production in 2003.

For building stock and urban structure, it was reported that the size of Australian dwellings is gradually increasing, however, the average number of persons per dwelling showed a steady decline from 3.5 persons in 1961 to 2.4 persons in 2001. Furthermore, it was also reported that the average size of new homes increased by 40.3% to 227.6 square metres between 1984-85 and 2002-2003. This may cause a trend away from separate houses towards medium and higher density housing, and is linked to a range of key factors, including government planners and private developers considering the need for lower-cost accommodation and convenience for commuters. Such potential high density housing may provide sound opportunities for establishing efficient urban infrastructure and services, such as roads, lighting and waste removal, which can be an opportunity for greenhouse gas abatement through practical measures such as improved intensity for street lighting and higher dependence on public transport (AGO 2005).

4.1.13 Agriculture

With regard to agriculture, a traditional and significant element for the economy in Australia: it accounts for less than 4% of GDP. However it is very significant in terms of trade. It accounts for around 23% of total Australian merchandise exports reported in 2004. In specific terms, Australia is the world's largest exporter of wool and beef, the second largest exporter of cotton, sheep meats and wheat and the third largest exporter of canola and barley, at the same as significantly exporting wine. It was estimated that the total area of establishments with agricultural activity was 439.5 million ha or approximately 60% of the total land use in 2003. Livestock grazing accounts for over 75% of all agricultural land, reported in 2003-2004 (AGO 2005).

GHG emissions by agriculture in Australia are a relatively more significant emission source than for most other OECD countries (except New Zealand). Despite the unique environmental circumstances in the country, such as floods, droughts and variable land use, agriculture is the most extensive form of land use. Employment in regional and rural area in Australia is also highly dominated by the agricultural sector. The large number of people employed in agriculture declined significantly in 2004 to 345,700 persons, and dropped significantly in 2003 due to the drought disaster across

Australia, which affected large areas of rural and regional land, limiting agricultural productivity in some regions and causing it to become cost ineffective. According to scientific sources, the range of these degradation events may become worse in the future. This would result in a large amount of Australian agricultural land being negatively influenced in the next 50 years due to transformation by salinity and soil acidity events and potential ecosystem collapse brought about by climate change (AGO 2005).

4.1.14 Forestry

Forestry in Australia has a unique profile, ranging from tropical and temperate rainforests to mulga scrub. Australia's forests have significant diversity in their species composition, structure and in the fauna they shelter and support. Many forest species are acknowledged as unique to Australia, with more than 2,800 of the 3,000 species being endemic. As for eucalypts, these are highly dominant in forests, with over 700 species identified principally in Australia. The total area of Australian native forest is around 163 million hectares, about 21% of the continent. Most of the forest consists of woodland and mallee. Australia also has 1.7 million hectares of plantations, including about 59% introduced pines and 41% native hardwood species (mostly eucalypts), with the proportion of native hardwood species in the national estate increasing. Less than 1% of available area in the native forests is harvested per annum, while total plantation sites increase each year (AGO 2005). Give this, a large amount of Australia's forest is regarded as unique ecosystem diversity.

4.1.15 Summary

To sum up, this section has demonstrated the national situation of Australia over the period. In order to give a clear picture of these circumstances, the section selected a number of key aspects reported under the UNFCCC guidelines, namely: government structure; population profile; geographic profile; climate profile; economic profile; energy; transportation; industry; waste; agriculture; and forestry. Furthermore, in the light of national background, it found a number of unique circumstances in this country: rapid population and economic growth; changing land-use patterns; the necessity for long-haul transport across vast distances; a significant concentration of population density; limited hydro-electric resources, unutilised nuclear energy industry and a high reliance on inexpensive fossil-fuel reserves for power generation; huge exports of energy commodities and energy-intensive materials; and a high dependency on agriculture; and the fragility of its environmental systems all of which render it particularly vulnerable to the effects of climate change. Therefore, Australia has unique circumstances and it is evident that the circumstances have to be considered in terms of devising the most suitable climate solutions for the domestic climate change approach.

The following section will describe data for the national emissions of Australia. This will present a clear picture of how much Australia has contributed to global GHG emissions as well as its emission changes in a historical context, including over the period 1997-2007.

4.2 National Emissions

4.2.1 Introduction

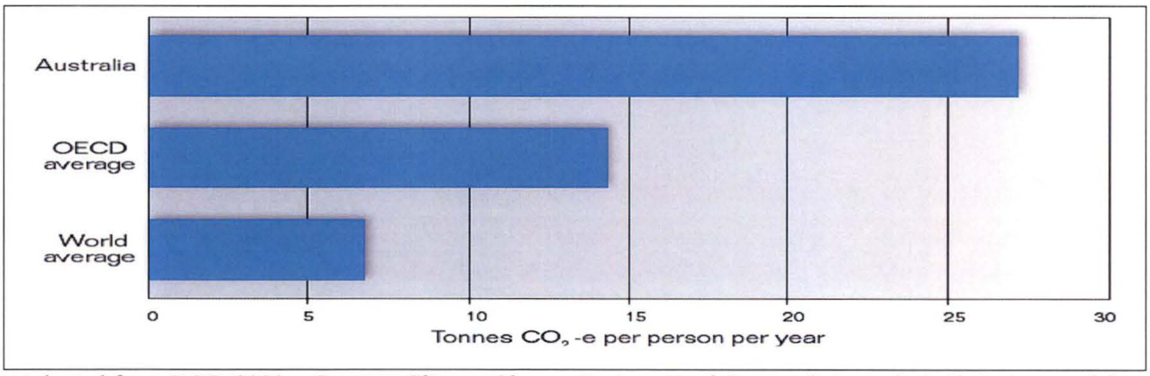
The objectives of this section are to describe the national emission trends in Australia as found in the most recent data. Firstly, it will examine the global position of Australia when comparing global national emissions and per capita GHG emissions. Secondly, it will examine national emission trends in Australia. Thirdly, it will break down emissions by sector, namely: energy; industrial processes; solvent and other product use; agriculture; land use; land use change and forestry; and waste. Fourthly, this section will demonstrate the consequence of national emissions based on the Kyoto accounting system. Finally, this section will conclude with the most recent data for national emissions in Australia.

4.2.2 The global position

Australia is currently recognised as the fifteenth highest emitter in the world, emitting the equivalent of 491 Mt CO_2. In comparison, the largest emitter, the United States, produces 6928 Mt CO_2 (Herzog et al. 2005). Moreover, Australia's per capita emissions are amongst the highest in the world, at around 27 tonnes of carbon dioxide equivalent per person, compared to 10 tonnes in Japan and 21 tonnes in the US (CSIRO 2005). Therefore, Australia has a significant part to play in the global responsibility for reducing GHG emissions.

As mentioned, Australia's per capita GHG emissions are among the highest of any OECD country and among the highest in the world. Only five countries in the world recorded higher, namely Bahrain, Bolivia, Brunei, Kuwait and Qatar. The figure 4.4 below shows Australia's per capita GHG emissions in 2005 as compared to the OECD and world average (DCC 2008a).

Figure 4.2: CO_2 Per Capita, GHG Emissions, 2005



Adapted from DCC. 2008a. *Garnaut Climate Change Review: Draft Report. 8 Australia's Emissions and the Economy*. Cambridge: Cambridge University Press. URL: < www.garnautreview.org.au.>. Consulted 25 October 2008.

In 2005, it was reported that Australia's per capita emissions were twice the average of OECD countries, and more than four times the world average (DCC 2008a).

4.2.3 The national emission trends

Since Australia became a party to the UNFCCC [United Nations Framework Convention on Climate Change] in 1992, and committed to report updated national inventories each year, Australia has made provisions for these national inventories. Most recently, Australia updated and published the latest estimates of the national emission trends (GHG emissions) in 2006, in The *National Inventory Report 2006*. This report accounts for the period 1990 to 2006. The inventory report used the method described in the *Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2006*. The methodologies conform to the requirements of the international guidelines under the UNFCCC. Currently, the Department of Climate Change is the main institutional climate policy actor in Australia. Furthermore, the methodologies used in the estimation of the national inventory have improved over time, and there is commitment to refine them as updated new data are issued, and systematically adapted whenever demands emerge internationally for example as a result of Kyoto style negotiations (DCC 2008b).

The *National Inventory Report 2006* estimates the major GHG emissions as: carbon dioxide, methane, nitrous oxide, perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride. Furthermore, the report also covers indirect GHG emissions such as carbon monoxide, oxides of nitrogen, and non-methane volatile organic compounds. Sulphur dioxide, an aerosol precursor, is also included, as are gas emissions which influence rising temperatures in the atmosphere.

The emissions and removals have been categorised into six sectors, as defined by the IPCC. These sectors are regarded as representing the main human activities in terms of releasing or capturing of GHG emissions from the atmosphere and include: energy; industrial processes; solvent and other product use; agriculture; land use; land use change and forestry; and waste. Therefore, the data in the *National Inventory Report 2006* from the Department of Climate Change in Australia will be very important in terms of addressing the national emission trends in this country. However, it should be mentioned that there is another emission inventory which exists in this country, namely the inventory used for the National Greenhouse Strategy (DCC 2008c).

The strategy was established for a successful provision in terms of reaching Australia's Kyoto protocol targets. Although Australia had not ratified Kyoto when the strategy was made, it still intended to accomplish its Kyoto targets through the national plan (DCC 2008c). The results were that Australia met its Kyoto targets but did not ratify the Protocol during Howard's political regime. However, the Kyoto accounting methods differ from those under the UNFCCC. The most different aspect is the way of accounting for forest sinks (DCC 2008c). However, this section does not intend to discuss the critical issues, but rather focuses on addressing national emission trends. Although, this section mainly examines the data for the national emission trends from the *National Inventory Report 2006*, later there will be a brief examination of the results of national emission trends based on the Kyoto accounting.

4.2.4 National trends, 1990 to 2006 (UNFCCC accounting rules)

The latest data from the *National Inventory Report 2006* describes Australia's emission changes over the period 1990 to 2006. Table 4.2 below describes changes in total net CO_2-equivalent (CO_2-e) emissions from greenhouse gas emissions over the period. In 2006, the total net emissions were 549.9 Mt CO_2-e. This represents an increase of 6.6% from the 1990 levels of 515.9 Mt CO_2-e. This indicates a significant increase of greenhouse gas emissions in Australia (DCC 2008b).

Table 4.2: Changes in Total Net CO_2-e Emissions by Gas, 1990-2006

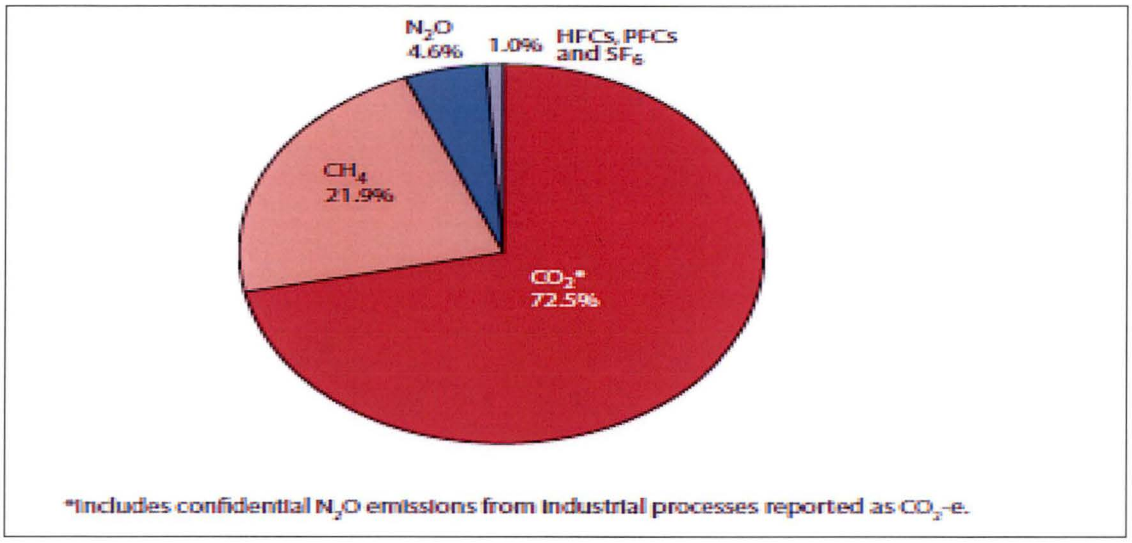
Greenhouse gases	1990 Mt CO_2-e	2006 Mt CO_2-e	1990% of Total	2006% of Total	Changes Mt	% Change in emissions
CO_2 [(a)]	370.3	398.6	71.8	72.5	28.3	7.6
CH_4	119.9	120.4	23.2	21.9	0.5	0.4
N_2O	20.1	25.2	3.9	4.6	5.0	25.0
HFCs	1.1	4.6	0.2	0.8	3.5	312.7
PFCs and SF_6	4.5	1.1	0.9	0.2	-3.4	-75.2
Total CO_2-e	515.9	549.9			34.0	6.6

(a) Includes confidential CO_2 and N_2O data from industrial processes reported as CO_2-e.

Adapted from DCC. 2008b. *National Inventory Report 2006-Volume 1: The Australian Government Submission to the UN Framework Convention on Climate Change*. Commonwealth of Australia.

Figure 4.5 below shows the largest contribution to net emissions was from CO_2-e emissions comprising gas in 2006. The total was 398.6Mt or 72.5%. Emissions were followed by methane, which contributed 120.4 Mt CO_2-e or 21.9%. Carbon dioxide is thus the most important source of GHG emissions in Australia (DCC 2008b).

Figure 4.3: Contribution to Total Net CO_2-e Emissions by Gas, 2006



Adapted from DCC. 2008b. *National Inventory Report 2006-Volume 1: The Australian Government Submission to the UN Framework Convention on Climate Change*. Commonwealth of Australia.

4.2.5 The sectoral trends

As total net emissions increased, the energy, industrial processes, solvent and other product use, agriculture, land use, land use change and forestry and waste sectors have also shown individual changes over time. Table 4.3 and Figure 4.6 below describe trends in emissions and removals by sector over the period 1990 to 2006.

In 2006, the inventory report acknowledged that Australia's net GHG emissions were 549.9 (Mt), (CO_2-e). Table 4.3 shows seven sectors were the main sources of the national net emissions. The inventory also categorised three subsections, including stationary energy, transport and fugitive emissions, into one as combined energy source. This combined energy source was the largest source of GHG emission by 400.9Mt. Although this proportion is lower than in many countries, the fact is due to the relatively large contribution from the agriculture sector, of 16.4%. Other relatively small emission sources included industrial processes, such as from the manufacture of mineral products, emissions from waste disposal and land use, land use change and forestry (DCC 2008b).

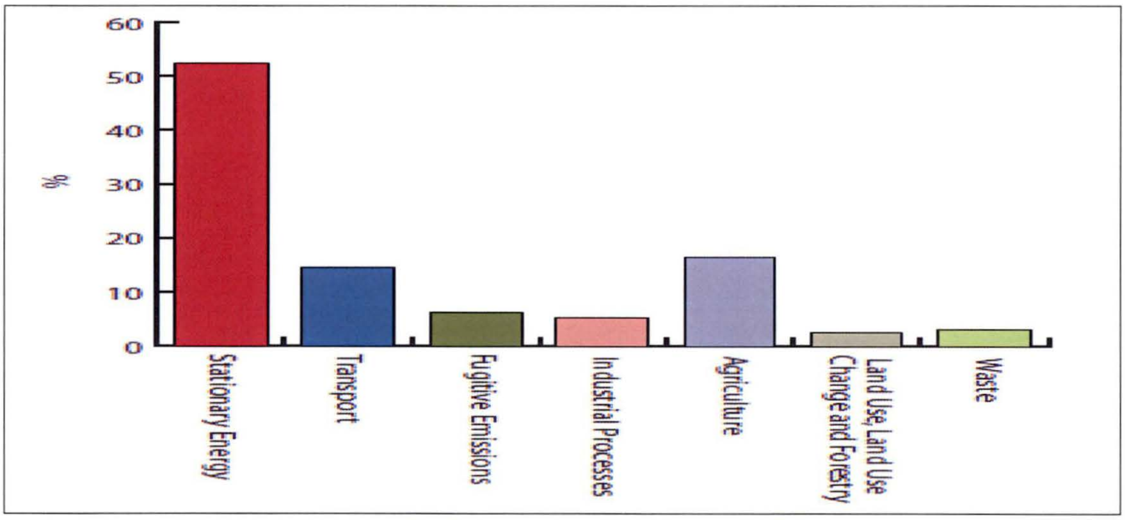
Table 4.3: Australian Net GHG Emissions by Sector, 2006

Sector and Subsector	CO_2		CH_4		N_2O		CO_2-e	
	Mt	%	Mt	%	Mt	%	Mt	%
1 All energy (combustion + fugitive)	367.8		1.4		0.01		400.9	
Stationary energy	285.3	71.6	0.1	0.9	0.003	3.9	287.4	52.3
Transport	76.8	19.3	0.03	0.5	0.01	6.9	79.1	14.4
Fugitive emissions from fuel	5.8	1.5	1.4	23.8	0.0001	0.1	34.5	6.3
2 Industrial Processes	22.6	5.7	0.003	0.1	0.0001	0.1	28.4	5.2
3 Solvent and other product use[a]	NA	NA	NA	NA	IE	IE	IE	IE
4 Agriculture	NA	NA	3.3	58.0	0.1	80.7	90.1	16.4
5 Land use, land use change and forestry	8.1	2.0	0.2	3.4	0.005	6.1	13.8	2.5
6 Waste	0.03	0.01	0.8	13.3	0.002	2.3	16.6	3.0
Total net emissions	398.6		5.7		0.08		549.9	

(a) Emissions are included in industrial processes for confidentiality reasons.
(b) HFCs, PFCs and SF_6 are not separately reported here but are included in the CO_2-e totals

Adapted from DCC. 2008b. *National Inventory Report 2006-Volume 1: The Australian Government Submission to the UN Framework Convention on Climate Change*. Commonwealth of Australia.

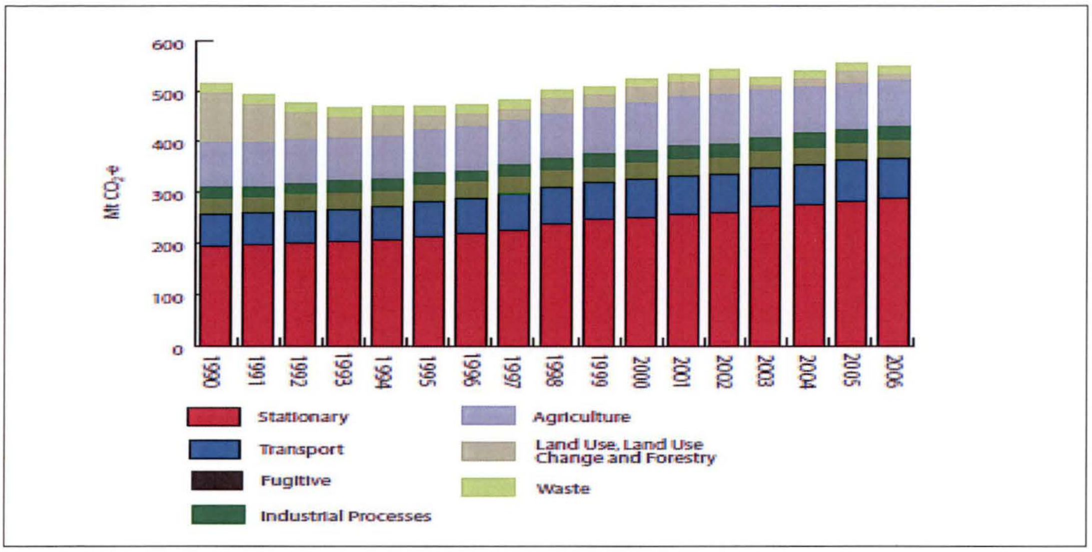
Figure 4.4: Contribution to Total Net CO_2-e Emissions by Sector, 2006



Adapted from DCC. 2008b. *National Inventory Report 2006-Volume 1: The Australian Government Submission to the UN Framework Convention on Climate Change*. Commonwealth of Australia.

Figure 4.6 shows the largest emissions sources in terms of total net emissions. In terms of the level of individual GHG emissions, the energy sector was the major contributor to carbon dioxide emissions at 367.8Mt or 92.3%. Agriculture is the main contributor of methane at 3.3Mt and nitrous oxide at 0.07Mt or 80.7% (DCC 2008b).

Figure 4.: Trends in Emissions and Removals by Sector, 1990-2006



Adapted from DCC. 2008b. *National Inventory Report 2006-Volume 1: The Australian Government Submission to the UN Framework Convention on Climate Change*. Commonwealth of Australia.

Figure 4.7 also describes the trends in greenhouse gas emissions and removals by sector over the period 1990 to 2006. The stationary sector was the largest emitter, and shows a significant increase in carbon dioxide emissions (47.3% or 92.2 Mt) between 1990 and 2006 (DCC 2008b). This emissions data was produced in accordance with the accounting rules of the UNFCCC. An alternative system of measurement, which is an important addition to the UNFCCC scheme, is presented by the Kyoto accounting rules. The following section demonstrates this alternate system.

4.2.6 The national trends (Kyoto accounting rules)

This section will demonstrate trends in national net emissions under the Kyoto accounting. The trends under Kyoto accounting differ from the data reported under the UNFCCC rules, the major differences being the way forest sinks are treated. Table 4.4 shows the data for Australian net GHG emissions in 2006 by sector under Kyoto accounting.

Table 4.4: Australian Net GHG Emissions by Sector under Kyoto Accounting, 2006

Sector and Subsector	CO_2	CH_4	N_2O	HFCs/PFCs SF_6	CO_2-e
	Mt	Mt	Mt	Mt	Mt
1 All energy (combustion + fugitive)	**367.8**	**30.4**	**2.7**	**NA**	**400.9**
Stationary energy	285.3	1.1	1.0	NA	287.4
Transport	76.8	0.6	1.7	NA	79.1
Fugitive emissions from fuel	5.8	28.7	0.02	NA	34.5
2 Industrial processes	**22.6**	**0.1**	**0.02**	**5.8**	**28.4**
3 Solvent and other product use[a]	**NA**	**NA**	**IE**	**NA**	**IE**
4 Agriculture	**NA**	**69.8**	**20.3**	**NA**	**90.1**
5 Waste	**0.03**	**16.0**	**0.6**	**NA**	**16.6**
6 Land use, land use change and forestry	**37.4**	**2.1**	**0.6**	**NA**	**40.0**
Total net emissions[b]	**427.8**	**118.3**	**24.2**	**5.8**	**576.0**

(a) Emissions are included in Industrial Processes for reasons of confidentiality (b) Strictly speaking the net credits from land use change and forestry should only enter the account during the first commitment period (2008-2012). Their inclusion in the 2006 Inventory helps our understanding of Australia's emissions in relation to the Kyoto emissions target which is estimated to be 597 Mt each year over the first commitment period.
NA = not applicable, IE = included elsewhere

Adapted from DCC [the Department of Climate Change]. 2008c. *National Greenhouse Gas Inventory 2006: Accounting for the Kyoto Target*. Act: Australia.

As shown above, by using Kyoto accounting, total emissions of 576.0 Mt CO_2-e were reported in 2006 against 552.6Mt CO_2-e in 1990, which is an increase of 4.2% (DCC 2008c). On the other hand, the UNFCCC accounting reports 549.9Mt CO_2-e in 2006 against 515.9Mt CO_2-e in 1990 which is an increase of 6.6% (DCC 2008b). The most significant difference in the two data sets is the results for land use, land use change and forestry [LULUCF]. Kyoto rules allow a decrease of 53.9% in land clearing from 1990 to 2006, while only 45.5% is allowed under the UNFCCC accounting (DCC 2008b). Although this thesis emphasises the data for national emission trends under the UNFCCC accounting rules, these data comparisons between the UNFCCC and Kyoto accounting recognised above are very important in terms of identifying the most relevant data for national emission trends.

4.2.7 Summary

This section has examined the most recent data for national emissions trends for Australia. To do so, the section firstly described the Australian national emissions profile in a global context and demonstrated that Australia is one of the most critical emitters at the international level. The section then presented national data reported under the UNFCCC accounting system. This section also described the national emissions by sectors, and identified a large increase in total national emissions with the emission increase most dominant in the energy sector. Furthermore, it was shown that each sector has contributed to different levels of emission changes over time, because of different circumstances such as rising population and economic growth. Moreover, the section also contrasted UNFCCC data (UNFCCC accounting rules) with data collected by the Kyoto accounting system. The UNFCCC and Kyoto accounting rules apply emphasis to different factors in the measurement of emissions, especially with regard to land use and forest sinks. Even though this thesis mainly uses the UNFCCC data as the major source of emissions calculation in Australia, it also recognises the importance of variable data sources in attempting to best understand Australia's national emissions trends.

The following section will demonstrate the history of climate policy development in Australia. The section addresses what the national government developed and how, in regard to national climate change policy. The focus is on addressing political circumstances and their implications for national initiatives over the period 1997-2007 in the Howard political regime.

4.3 Australian Climate Change Policy 1997-2007

4.3.1 Introduction

This section examines the development of climate change policy by the Australian government over the period 1997 to 2007, which was chosen because the domestic greenhouse policy of this era reflects one of the most critical periods in terms of GHG mitigation policy by one of the most carbon intensive nations. Australia has been one of the most highly carbon intensive countries in the world. When the rest of the world was demanding strong initiatives from developed nations in terms of immediately implementing actions to reduce GHGs, Former Prime Minister, John Howard held power during this decade and designed and implemented an individual domestic approach largely dominated by voluntary-based activities, without taking global responsibility as a developed nation for reducing GHG emissions through the first world international agreement on climate change action (i.e. Kyoto Protocol). These findings were essential for the following case studies in order to address and appreciate policy background and significance. This section selects five major perspectives in terms of demonstrating his governments' policy impact in relation to climate change policy: i) backgrounds of international negotiation (the Kyoto Protocol) ii) domestic policy measures iii) proposed emission trading scheme iv) legislation by the federal government v) financial commitments.

4.3.2 International negotiation

During the Howard regime between 1997 and 2007, one of the most significant aspects of climate change policy was the background or context of international negotiations. The Kyoto Protocol is the first international treaty with binding country targets for the reduction of GHG emissions (Fletcher 2005). Under the Protocol, agreed in principle in 1997, 38 developed countries and economies agreed to an aggregate five per cent reduction in GHG emissions from 1990 levels by 2008-2012

(Aiba and Tatsuyoshi 2001), also known as the 'first commitment period' (FCCC 1998).

The agreement incorporates a number of methods, such as differentiated targets, the Clean Development Mechanisms [CDM], and the exception of developing countries during the initial commitment period. Specifically, in terms of the differentiated targets, Australia was allowed an increase up to 108 per cent against the 1990 levels, rather than a decrease. This means Australia has a huge advantage under the treaty compared to other countries. In contrast to Australia, Japan is required to achieve a 6 per cent cut in emissions and the USA is expected to produce a 7 per cent cut (Aiba, T. and S. Tatsuyoshi. 2001). However, in spite of such leniency, the Australian government chose not to ratify the treaty during the Howard regime, although Howard did commit to achieving the differentiated target set for Australia as a part of his commitment to climate action under the UNFCCC (AGO 2001). A clear picture of the history of Australian climate change policy between 1997 and 2007 depends, to a large degree, on understanding the critical significance to the Australian government of the Kyoto treaty. The following section provides background on the Australian positioning on the Kyoto Protocol.

4.3.3 The Kyoto Treaty

The history of climate change policy in Australia over the last two decades has involved three governments (Hawke, 1983-1990; Keating, 1991-1996; and Howard, 1997-2007) and significant change (Curran 2003). A first significant step occurred in the late 1980s, during Prime Minister Hawke's regime (Christoff 2005). As determined by global agreement, after the UNFCCC was established a world summit was held in 1992. Following this, the first Conference of Parties (COP1) to the UNFCCC was held in Berlin in 1995 during the Keating regime (Papadakis 2002). Elected in 1996, the involvement of the Howard government in the global response to climate change began at the time of the COP2 in Geneva. The government strongly argued at the COP2 on certain matters: the IPCC science, legal binding targets and differentiated target settings were all questioned. The reason for Howard's actions was the nation's reliance upon fossil fuel for its economic resource (McDonald 2005).

The government appealed against these matters with data for how unique the national circumstance is and how the treaty would create negative impacts on the nation. However, later it was found that this data was entirely uncertain, and dominated by information and suggestions from the fossil fuel industry and its lobby groups (Commonwealth Ombudsman 1998). At the end of the COP2 the government concluded with continued consideration of a legal obligation of compliance, and the necessity of differentiated targets (McDonald 2005).

After these events, at the COP3 in Kyoto in Japan in 1997, Australia kept resisting legal compliance with Kyoto targets because of the significant risks associated with reducing GHG emissions (Christoff 2005). Finally, Australia won 'differentiated targets' because of its particular economic circumstances, and succeeded in achieving a target limiting its greenhouse gas emissions growth up to 108 per cent of its 1990 baseline, which reached equal to nearly a 30 per cent reduction from its 'business as usual'[28] projections (Roarty 2002). Australia was one of only three developed nations, including Norway and Iceland, to be allowed increases in its emission levels on its 1990 baseline, rather than reductions, while other developed nations accepted a reduction in their greenhouse gas emissions by at least 5 per cent to the baseline (Stuart et al. 1998).

Since the COP3 in Kyoto, the Kyoto treaty identified a range of actions to offset emission growth, including: growing forests; reafforestation; improved forestry; and cropland and grazing land management practices. The agreement did not consider the amount of sink credits, which was determined later on. Countries were, however, given quotas set out in Annex Z of the non-agreement that reflected their own circumstances (Roarty 2002).

In COP6, a significant part of the negotiation was about 'carbon sinks', at the insistence of Australia and the United States (Egenhofer et al. 2001), and there was a

[28]"the IPCC has structured its projections about future trajectories for greenhouse gas emissions and climate change under various scenarios. The IPCC scenario with assumptions of future economic growth and emissions intensity which analysis of the Review to-date indicates, is the most likely to be closest to the twenty-first century reality in the absence of any effective mitigation called 'business as usual' or A1FI. In *Garnaut Climate Change Review: Interim report to the commonwealth, state and territory governments of Australia*, eds, The Commonwealth of Australia. 2008. pp.12. (Electronic copy: http://www.theaustralian.news.com.au/files/garnaut.pdf)

major conflict between the European Union and the US regarding the role of 'flexibility mechanisms'. Members of a loosely aligned Umbrella Group including Australia, Canada, Japan, New Zealand, Russia, Iceland, Norway and Ukraine followed the United States position (Egenhofer et al. 2001). However, after the United States rejected ratification of the Kyoto treaty in 2001, but with the acceptance of the other countries, negotiations continued between the remaining Parties at COP7 in Marrakesh to become a possibly acceptable, further ratification (Justus et al. 2002). The final Marrakesh agreement on the process concluded that flexibility mechanisms should include: emissions trading, joint implementation and the Clean Development Mechanism [CDM] (Fletcher 2005). Most significantly, a mandatory base of 'commitment period reserve' (the period 2008-2012) was imposed. "This requires parties to withhold from the emissions market 90 per cent of their assigned amount or 100 per cent of five times the most recently reviewed inventory, whichever is lower" (Jakeman et al. 2002: 178).

With respect to Australia's position, a number of key priorities for the sink outcomes can be incorporated. These are that no credit limits are allowed from afforestation and reafforestation activities, and included revegetation as an extra sink activity. This removed the potentially substantial and artificial country penalty for new fast-growing, short-rotation forest plantations, which would particularly affect Australia's eucalypt plantations (Mead, et al. 2001). Furthermore, sink credits would be specifically accepted as 'removal units' and unable to be accepted and transferred from the first commitment period (2008-12) to the second commitment period (post-Kyoto) (Crowley 2007). In a consideration at COP7 in 2001, a number of parties' accepted the negotiated achievements and outstanding efforts of the Buenos Aires Plan of Action (COP4), but, the United States' withdrawal from the treaty saw the departure of the biggest emission contributor in the world (Babiker et al. 2002).

Although Australia totally won their negotiation with respect to achieving a favourable outcome, the government then chose not to ratify Kyoto. Instead they committed to further global response without legal alignment with the international framework, and to its own approaches based on 'differentiated' achievement and 'no regrets' approaches (Crowley 2007). After COP7 was concluded, Kyoto discussions continued to develop a legal global outline, with COP8 in New Delhi, India, in 2002;

Cop9, Milan, Italy, in 2003; COP10, Buenos Aires, Argentina in 2004; COP11 in Montreal, Canada in 2005 (After Russia finally ratified Kyoto, the Protocol became formally accepted and in February 2005 entered into force); and COP12 in Nairobi, Africa in 2006 (Hamada 2006).

Australia had no positive response to the ratification until the end of the Howard government in late 2007, but kept pursuing its own approaches and interests whilst watching the progress of the Kyoto treaty and its target frames. Finally, Kevin Rudd became Labor Prime Minister, and ratified the Kyoto Treaty in late 2007 (ABC NEWS 2007), with implementation efforts now underway and that are not the subject of this thesis. Against the background of an historical development through international negotiation by the Australian government, John Howard put a range of efforts into negotiation during his political regime, in order to take account of his political interests in the international position over time. Prime Minister Howard also initiated various types of policy measures over time.

Despite the fact that Australia did not until 2007 accept any international binding target under the Kyoto Protocol, the nation has an obligation to submit national communication on their domestic climate change affairs to the UNFCCC, which was formally decided at the World Summit in 1992. This required committed nations to provide their climate policy's national trends periodically to the UNFCCC (FCCC 1998). Australia has made four communication reports so far; the Howard government conducted three reports during 1997-2008. These included: the second communication in 1997 by the Commonwealth of Australia; the third communication in 2002 by the AGO; and the fourth communication in 2005 by the AGO (AGO 2005). These national documents are very important as the most relevant data source for national activities on climate change policy. The following section will examine the Howard Government's domestic policy measures initiated over the period of 1997-2007, from the data supplied in these national communication reports to UNFCCC.

4.3.4 Domestic policy measures

The Australian Commonwealth Government initiated four major packages to tackle GHG emission reductions over the period 1997-2007 comprising: the '1997 Safeguarding the Future: Australia's Response to Climate Change'; the '1998 National Greenhouse Strategy'; the '1999 Measures for a Better Environment Package'; and '2004 Securing Australia's Energy Future Measures' (AGO 2005). These main approaches were based on the 'no regrets' policy, to which the Howard government was strongly committed during his political regime (Sullivan 2007). The concept of no-regrets means global environmental achievement is to be accomplished without economic risks or limits to development (McDonald 2005). However, it is often argued that the balance between environmental and economic objectives is not weighted at the same level, especially for the climate change policy process in Australia, which has placed great emphasis on the importance of economic growth (Bulkeley 2001).

In November 1997, the Prime Minister announced the '1997 Safeguarding the Future: Australia's Response to Climate Change'. Howard was committed to implementing a range of policy activities through this measure (AGO 2002b). A first significant initiative was delivered with the establishment of the Greenhouse Challenge Program [GCP] by the Commonwealth Government. This was an extension of the original voluntary measure from the previous ALP Keating government's climate policy approach based on a voluntary cooperative program between industry and government intended to either reduce or mitigate GHG emissions over the long term. The GCP was expected to reduce emissions by more than 21 Mt CO2-e by 2000. At the time, Australia's greenhouse gas emissions were the equivalent of 380 Mt of carbon dioxide in 1990 and 403 Mt in 1995, representative of an increase of about 6% in that period (excluding land clearing) (CWLTH 1997).

Under 'Safeguarding the Future: Australia's Response to Climate Change', a number of programs were implemented to place Australia's emissions within a range of 118-120 per cent of the 1990 baseline of national targets and reduce Australia's net emissions growth from 28% to 18% (excluding land use change) or some 39 Mt of emissions by 2010 (from 494 Mt to 455 Mt). This package also contained completely new measures and a substantial expansion of existing programs (CWLTH 1997). Under the measure other activities include renewable energy; energy market reform; the automotive industry incorporating fuel standards; tree planting and revegetation, which are based on a voluntary based approach with focus on the 'no regret' measures (CWLTH 2000b; Hon et al. 2002; ANAO 2004; and Hunt 2004). The package also included establishing the Australian Greenhouse Office [AGO] in April 1998, which was the first dedicated greenhouse office in the world. The AGO is responsible for undertaking most of the policy measures for nation climate actions regarding GHG emission abatement (AGO 2002b). Later the AGO was upgraded to a separate agency within the Commonwealth Government Department of Environment and Heritage (Lister 2004), and later a Department of Climate Change.

In November 1998, the federal government introduced its National Greenhouse Strategy [NGS] (CWLTH 1998), which was a significant part of Australia's response to Kyoto (Bulkeley 2000), and was also intended to produce a framework for advancing Australia's domestic greenhouse initiative into the future. Under the Strategy, some 86 individual measures are grouped into eight sectoral 'modules', reflecting the whole range of policy actions, from voluntary measures and strategic financial supports to regulation and market measures (CWLTH 2000a). Policy measures under the strategy mainly focused on three goals:

- building knowledge and understanding of greenhouse issues
- preventing greenhouse gas emissions
- forming the basis for adaptation to climate change

(CWLTH 2000a)

This strategy was also expected to implement its measures in conjunction with activities among the Commonwealth, State and Territory Governments. Furthermore, the strategy also aimed to benefit from the efforts of industry, non-governmental organisations, and local governments (CWLTH 1998). It was earmarked for review during 2002, or earlier, depending on the circumstances in the UNFCCC and the Kyoto protocol, and it was also committed to providing biennial progress reports for the implementation of the NGS. The review has been held and was contained in the

Third Communication in 2002 and the Fourth Communication in 2005. However, the biennial progress report has not been publicly released since the independent review of the AGO in 2002 was released.

In June 1999, the Commonwealth Government released a series, 'Measures for a Better Environment', including a revised tax system package. These programs contained new measures to assist photovoltaic and other forms of renewable energy, and the use of alternative fuels (CWLTH 2000b)[29]. A major program, which started in July 2000, was the Greenhouse Gas Abatement Program [GGAP] (Smith 2002).

Following these events, another major policy package 'Securing Australia's Energy Future' was announced in 2004. The new package was intended to deliver energy reliability, competitive energy supplies, and efficient energy markets, encourage investment, and secure energy to consider greenhouse emissions, renewable energy, bio-fuels, clean fossil fuels, and international partnerships (AGO 2004a). In terms of mitigating greenhouse gas emissions, a number of measures were introduced with government spending over AUD2.5 billion in funding, some of which extended beyond previous programs. These measures were: Low Emissions Technologies Demonstration Fund (LETDF); Renewable energy technologies such as the Solar Cities program; GCAP; GCP; and Mandatory Renewable Energy Target [MRET] (CWLTH 2004).

'Securing Australia's Energy Future' also included a variety of assistance programs including: 'renewable energy for remote power generation'; 'solar power on residential and community buildings'; 'equity funding such as venture capital for innovation' and ; 'R&D and industry development activities'. Other programs included MRET and the National Framework for Energy Efficiency (Sullivan 2007). A further funding package opportunity called 'Energy Security Initiatives', was also provided in August 2006, which was committed to nearly AUD1.6 billion over eight years. The key focuses were: 'rebate for LPG vehicle conversions'; 'expanded oil & gas exploration program'; 'support for ethanol infrastructure development'; 'develop

[29] This only happened because of negotiations with the Australian Democrats holding balance of power in the Senate.

a gas to liquids R&D proposal'; and 'extend & expand the renewable remote power generation program'(AUSGEO 2006).

Within the 'Energy Security Initiatives' package, the Howard government emphasised that Australia lead the world in clean coal technology (CCT) from 2006. For CCT research, development & demonstration in CO_2 storage, CCT provided the 'Integrated Gasification Combined Cycle (IGCC)', 'Oxy-Fuel Combustion', 'Post Combustion Capture', and 'Ultra Clean Coal' (Coal21 2006). In terms of the international association with CCT, the package noted associations with the Carbon Sequestration Leadership Forum (CSLF), the Asia Pacific Partnership on Clean Development and Climate (AP6), and the Methane to Markets Partnerships. At the same time, the Commonwealth Government was committed to the AP6. The government was also committed to spending AUD 100 million over five years for renewable projects, 'Chairing Cleaner Fossil Energy and Aluminium Task Forces', and 'Co-chairing Renewable and Distributed Energy Task Force with Korea'. As to domestic R&D collaboration on CCT, CSIRO, the Co-operative Research Centres (CRCs), the Centre for Low Emission Technology (CLET) and the Australian Coal Association Research Program (ACARP) have worked together and new collaborative research institutions are under further consideration (CWLTH 2007a).

Therefore, these four major packages of the Australian government during the period 1997 to 2007 were very important initiatives for the domestic policy, namely: the '1997 Safeguarding the Future: Australia's Response to Climate Change'; the '1998 National Greenhouse Strategy'; the '1999 Measures for a Better Environment Package'; and '2004 Securing Australia's Energy Future Measures'. In addition to the policy background, the installation of an emission trading scheme at the national level was also considered during the same period as a significant policy tool for reducing greenhouse gas emissions, but this ultimately failed to eventuate. It is very important to understand how a critical policy tool for climate change policy in a country is considered and implemented and how failures arise. The following section describes how the proposed emission trading was considered and why it failed.

4.3.5 Proposed emissions trading system

The emissions trading system is a policy tool to enable facilitation of the 'polluter pays' concept, which allows companies to pay for emissions and which prices carbon into the market. This also awards credits to those who succeed in reducing pollution and will also allow tradable permits, with the most common system being the "cap and trade" system (CWLTH 2007b).

During 1999, the AGO released four discussion papers on emissions trading, including: establishing the boundaries, issuing the permits, crediting the carbon and designing the market (AGO 2002a). The concepts and its strategy framed in these published discussion papers were expected to deliver the implementation of an emissions trading system in Australia (CWLTH 1999). However, the government announced that a domestic trading emissions system would not successfully articulate with any international trading scheme (AGO 2002a). Despite this fact, the AGO was still in a position to advise for the further consideration of the system (AGO 2001), but was not in a position to have the power to implement it (AGO 2002a). After the federal government decided not to implement a domestic trading emissions system, state and territories and non-government environmental organisations chose to start another way to encourage possible adaptation for any emission trading system at the national level (Baker et al. 2004). In terms of continuous domestic pressure for a trading system at the national level, a number of individual initiatives were attempted in some states' jurisdictions, rather than waiting for action by the national government.

The first attempt occurred in NSW, called Greenhouse Gas Abatement Scheme (GGAS) launched in 2003, which was one of the first mandatory greenhouse gas emissions trading schemes in the world (IPRT 2004), and later the ACT followed the event in 2005 (ICRC 2007). The State and Territory governments also decided to establish a working group for further development of a proposed multi-jurisdictional emissions trading system called the National Emission Trading Taskforce [NETT], which was established in 2004 (STPCM 2005). This was intended to be in a position to undertake state-based preparation for the installation of a trading scheme at national level (Evan et al. 2007). These suggestions were submitted to the Prime Minister, John Howard, (BSSL 2006) without any positive response (Australian Labor 2007).

Meanwhile, other strong pressures on the federal government were also given by two of the environment ministers in 2000 and in 2003, and the government was also pressured by other organisations outside of the country such as the International Energy Agency [IEA] (Crowley 2007). In Dec 2006, the Prime Minister finally announced the establishment of a joint government body called 'the Prime Ministerial Task Group' on national emission trading, and the Task Group Final Report to the Prime Minister was released on May 31, 2007 (Commonwealth of Australia 2007). A number of recommendations to the federal government to install a national trading system were also submitted (Dunlop 2007; NAFI 2007; NFF 2007). The installation of the emission trading scheme had not occurred at the national level by the end of the period of Howard's political regime, although two independent bodies, the Prime Ministerial Task Group at the national level and NETT at the state jurisdictions and local level, were separately established as a framework for a national trading scheme (COAF 2007). It remained for the Rudd Labor government to pursue a scheme after 2007.

4.3.6 Federal government legislation

In the period of the Howard government, a number of further legislative developments were introduced by the national government. One of the significant developments at the national level was the *Renewable Energy (Electricity) Act 2000.* This legislation was assisted by the *Renewable Energy (Electricity) (Charge) Act 2000* (to create a penalty for renewable energy shortfall charge) and the *Renewable Energy (Electricity Regulations 2001)* (the regulations and support for the main Act). Under these Acts, the federal government required that an additional 2 per cent of electricity would be compulsorily generated from the renewable energy industry and this was expected to encourage the sale of electricity generated by accredited renewable sources to large electricity retailers and large purchasers of up to 9500 GWh per annum by 2010 (AGO 2003a). Both Acts and regulations, which were amended and came into force in 2006 (CWLTH 2006), reframed structures in relation to power station accreditation and baselines; eligibility of renewable energy sources; creation, registration, transfer and surrender of Renewable Energy Credits [RECs];

and Renewable Power Percentage [RPP] (to achieve targets as specified in the legislation in the interim) (CWLTH 2007c).

Another legislative activity was found in environmental legislation. The *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act] was enacted by the federal government in July 2000. This Act covers 'environmental assessment and approvals, protects significant biodiversity and integrates the management of important natural and cultural places'. A significant aspect of the Act was where it occurred. The proposed action must be approved by the Commonwealth Government, unless there is a bilateral agreement in the area between the Commonwealth and a state (CWLTH 2007d). From subsequent amendment, these regulations can also specify that an activity results in producing GHG emissions by a direct consequence of actions, particularly in generating or transmitting electricity which is of interest here (CWLTH 2006).

Another significant piece of legislation can also be found for the National Electricity Market [NEM] related to GHG emissions, as part of significant energy reform. Utilities of energy sources and an increase of greenhouse emissions from the stationary energy sector in Australia were required by federal law to be replaced by the creation of the NEM in Australia in the 1990s (COAG 2007). The NEM was established in 1999. This regulated access to energy linkages and introduced retail competition. There are also a number of privatisations within the Victorian and South Australian electricity industry, and Queensland's energy retail sector. The NEM was installed without incident. Annual investments run at around AUD700 million in electricity transmission infrastructure and AUD3 billion in the local distribution networks that supply electricity to customers. Real network investment would rise by around 40 per cent in the five years to 2007-08, taken up largely by transmission expansions and upgrades. For a longer term perspective, the NEM has brought stable credibility, developed productive solutions and shown lower energy costs (Willett 2007). These legislative developments particularly related to the issues of environmental protection and sustainable energy sources and assisted to improve the frameworks of climate change policy at the national level in the period of the Howard government.

4.3.7 The financial commitments

With respect to policy funds for the national climate policy approaches during the Howard regime, a large number of investments were made by the national government between 1997-2007. The AGO coordinated climate change policy and aimed to deliver a number of programs under the greenhouse policy framework. It developed a strategic framework under the National Greenhouse Strategy in 1998. This strategy committed nearly AUD1 billion by the Commonwealth Government (endorsed by State and Territory governments) to meet international commitments to tackle climate policy approach. The national government claimed that Australia was a world leader because of this government funding for greenhouse on a per capita basis (CWLTH 2000a), including AUD180 million for activities under 'Safeguarding the Future package' in 1997, and AUD769 million for programs under 'Measures for a Better Environment' in 1999 (AGO 2002b).

After these initiatives under the National Greenhouse Strategy, additional funding approaches were articulated in the 2004-2005 federal Budgets and the Australian Government's energy policy paper, the Energy White Paper Securing Australia's Energy Future (June 2004). These additional measures underpinned commitment to a further AUD1.2 billion (AUD463 million for 11 new measures in the federal Budget and AUD749 million for lower emissions and renewable energy technologies in the Energy White Paper) for a new climate change strategy, which was publicly reported in the fourth national communication to the UNFCCC in 2005 (AGO 2005). Some of the program budgets extended previous programs. These included AUD334.4 million for greenhouse gas abatements, AUD100 million for renewable technologies and AUD75 million for demonstration Solar Cities (Crowley 2007). The federal government further emphasised the development of technology for mitigating greenhouse gases. The Low Emission Technology Demonstration Fund (LETDF) committed to spend AUD500 million to be distributed between 2006 and 2012 and to assist the commercial demonstration of technologies that have the potential to lead large-scale greenhouse gas emission reductions in energy sector (MacGill et al. 2007).

The chart below illustrates packages introduced by the government and how much was spent over the period 1997-2007.

Table 4.5: Policies, Packages and Expenditure 1997-2007, under the Australian Government

<table>
<tr><th colspan="2">Packages</th><th>Actual expenditure (AUD)</th></tr>
<tr><td rowspan="3">NGS: National Greenhouse Strategy in 1998 (nearly 1 billion commitment)</td><td>Safeguarding the Future· Australia's Response to Climate Change in 1997</td><td>149.300 million</td></tr>
<tr><td>1999-2000 Budget Measures</td><td>21.600 million</td></tr>
<tr><td>Measures for a Better Environment in 1999</td><td>796.000 million</td></tr>
<tr><td rowspan="2">New Climate Change Strategy in 2004 (AUD1.2 billion commitment)</td><td>Securing Australia's Energy Future' in 2004</td><td>1.2 billion</td></tr>
<tr><td>Additional extended costs on programs</td><td>334.4 million for greenhouse gas abatements, 100 million for renewable technologies and 75 million for demonstration Solar Cities</td></tr>
<tr><td colspan="2">Total costs</td><td>Over 3.0 billon</td></tr>
</table>

Sources: (CWLTH 2000a; AGO 2002b; AGO 2005; Crowley 2007; and MacGill et al. 2007). CWLTH. 2000a. *The National Greenhouse Strategy: 2000 Progress report.* AGO, Department of Environment and Heritage, Canberra ACT. AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change.* Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change.* The AGO within the Department of the Environment and Heritage. Commonwealth of Australia. Crowley, K. 2007. 'Is Australia Faking It? The Kyoto Protocol and the Greenhouse Policy Challenge', *Global Environmental Politics.* November 2007, 17(4): 118-139. MacGill, I., H. Outhred., and K.Nolles. 2006. 'Some design lessons from market-based greenhouse gas regulation in the restructured Australian electricity industry'. *Energy Policy* 34: 11-25.

4.3.8 Summary

This section examined climate policy development by the Australian government over the period 1997-2007. In particular, it focused on describing a variety of events in terms of outcomes at the international and domestic level. The section also selected five major perspectives under the national initiatives, namely: the backgrounds of international negotiation (the Kyoto Protocol), domestic policy measures, proposed emission trading scheme, legislation under the federal government and financial commitments. A variety of national initiatives were instigated by the Howard government, such as his four policy packages (1997-2007): the '1997 Safeguarding the Future: Australia's Response to Climate Change'; the '1998 National Greenhouse Strategy'; the '1999 Measures for a Better Environment Package'; and the '2004 Securing Australia's Energy Future Measures' . These initiatives represent the

Howard government's key contributions to the global effort to reduce emissions. But they also represent a middle ground between international and domestic obligations that allowed the government to avoid binding international agreements, which would have potentially have had a negative impact on economic growth (and possibly domestic support for the government as the Rudd Government is now finding).

The following section will present an evaluation of climate change policy over the period 1997-2007. This will cover critiques of the Howard government's policy implementation over time and the importance of applying an instrument analysis to these circumstances.

4.4 Instruments and Greenhouse Policy in Australia

4.4.1 Introduction

The objective of this section is to provide an analysis of the Australian climate change policy instruments over the period 1997 to 2007. A number of critiques of the implementation of such instruments, designs and outcomes have emerged over time. This section covers seven critical aspects of national policy implementation in order to evaluate the significant instrument activities which took place in Australia. These are: the critical aspects in Australia; implementation, 1997-2007; the lack of global challenge; incompatible connections at intergovernmental levels; confusion of the inventory data, its concepts, and projection; absence of an Australian reporting system; and critiques by formal institutions. After covering each key aspect, this section will conclude by discussing the significance of an application of instrument analysis to the Australian climate change policy during the Howard regime.

4.4.2 The critical aspects in Australia

Of great significance to this thesis's analysis of policy instruments under Australian climate change policy is that Australia is one of the most carbon intensive countries among the developed nations, although Australia's total national emissions still remains at only 1.4% of world emissions (ACCI 2006). Australia is ranked amongst the fifteen highest emitters globally (CANA 2008). Australia has the second highest per capita emissions. The nation's per capita emissions in 2004 were 4.5 times the global average; which is just below the United States (CES 2008). The carbon intensity of energy (based on fossil fuel burned per unit of energy produced) is 20% higher than the world average, and 25 to 30% higher than values for the United States, Europe and Japan (Raupach 2007). Australia is thus one of the largest of the energy intensive and carbon intensive nations. In addition, as found in the previous section about national circumstances, a number of reasons account for the Australia's carbon intensity including: a rapid population and economic growth but still a small population compared to other developed nations; variation of land-use patterns; economic resources based on the huge natural resources; long-haul transport across vast distances; population densities in a small percentage of its overall territory; limited renewable resources; no nuclear energy adaptation; low-cost preservation of fossil-fuel for energy creation; being the most mining intensive country due to high demand of energy commodities and energy intensive materials; sensitive land products (i.e. agriculture) of its environmental systems. These circumstances lead Australia to contribute a huge amount in producing greenhouse gas emissions and mean that it must therefore take a great responsibility in global action to reduce greenhouse gas emissions.

A number of significant critiques of climate change policy implementation over the period 1997-2007 have emerged, in particular about the voluntary ideology that dominated policy instrument design and implementation. A number of critiques have also emerged in relation to the effectiveness of the Australian strategy of reducing GHG emissions, including: slow performance; inappropriate implementation; lack of integration of greenhouse objectives into other policy fields; slow performance; cost-ineffectiveness; irrelevantly resourced; inadequately designed and implemented (CWLTH 2000b). The following sections will examine not only significant issues related to instrument activities, but also a number of critiques of policy activities during the 1997-2007 period.

4.4.3 Policy implementation, 1997-2007

Firstly, at the international level, it was clearly acknowledged that the Howard government wished to avoid being part of international binding targets which might have a negative impact on the Australian economy. It is important to note that the government failed to ratify the Kyoto Protocol between 1997-2007 (Stavins 1997). With non-ratification as the Kyoto treaty as an international binding framework for GHG reduction, Australia developed its own policy framework instead, including the establishment of the Australian Greenhouse Office [AGO], when developing a broad range of programs in conjunction with business and the community, and aiming at creating the most beneficial ways to achieve their targets with particular emphasis upon their 'no regrets' principle (Curran 2003). In order to create the most collaborative approach to climate change policy with other nations, these countries must consider their domestic circumstances (Nordlhaus et al. 1996), but also their global responsibility (Stavins 1997). Otherwise global aspirations to reduce GHG emissions will never be accomplished (Carraro 1993).

In national terms, the primary objective of the AGO was to perform policy achievements with the greatest cost efficiency under the national strategy [NGS], in particular, using alternative options for energy resolution such as a development of renewable energy systems (Curran 2003). The Howard government followed Paul Keating's Labor government (1991-1996), by attempting to extend a range of actions for reducing GHG emissions by spending mostly on voluntary basis programs, including research and information (Christoff 2005) and other 'no regrets' measures (Curran 2003).

The AGO accomplished some important objectives and succeeded in introducing some important new environmental policy instruments, especially the Greenhouse Challenge Program [GCP] with its emphasis upon voluntary involvement, and which the Howard government expanded from the previous Keating government. This approach aimed to encourage business involvement in federal action for GHG abatement. However, it had limited achievements because of its voluntary initiatives and focus on 'no regrets' measures. The main point of the critiques is that there was limited enthusiasm for investment in abatement technologies as well as limited power for GHG reduction action on the basis of voluntary, self-regulatory efforts, with the consequence of minimal emission abatement (Curran 2003). The voluntary concept under the GCP was changed slightly midway through the Howard regime with a new climate change strategy introduced in the national budget in 2004 (AGO 2005), with, however, the same result.

Under the new strategy in 2004, one of the main changes was to extend the existing GCP but with limited regulation (only restricting conditions for participation), which can be acknowledged as a mixed instrument, part voluntary and part regulatory. There will be a full discussion of the GCP in coming chapters. Sullivan (2007) also acknowledged that the Australian government seemed to be avoiding adopting stronger policy instruments over time, such as emissions trading (Sullivan 2007).

With respect to global achievement in reducing GHG emissions beyond the Kyoto Protocol (2008-2012), there should also be consideration of cleaner energy initiatives. It is very important to emphasise both the emissions targets and policy instrument choices of any climate change policy approach in order to reduce the uncertainty of their effectiveness. Sullivan (2007) argues that the Australian government would need to adopt a legal climate policy framework at the international and domestic levels, with long-term targets (over the next 30 to 50 years) in order to adequately reduce emissions. He also stresses the importance of improved monitoring and implementation systems, such as market instruments (i.e. emissions trading and taxes), and further energy efficiency (i.e. less dominance of fossil resources) in the electricity generation sector and across the economy. Sullivan concludes that these measures could reduce the uncertainty of reducing emissions because they are marketable and enforceable policy instruments (Sullivan 2007).

More specifically, the energy sector in Australia has been criticised on the point that the energy reform had a lack of consideration for energy efficiency and has been focused only on price. Rather than focusing on reducing greenhouse gas emission, the sector concentrated on using more energy sources and reducing prices which ultimately resulted in an increase in emissions (AGO 2006). Additionally, another critique concerns the possible loss of competitiveness. This would highly influence the development of renewable energy technology. Accordingly, the NEM [National Energy Market] did not focus on investing in renewable energy technology in Australia, because of the potential impacts on cost ineffectiveness. Such investments would be necessary to create potential energy efficiency over the long term, however the NEM faced some difficulties such as lack of funding, and institutional interference. Given these backgrounds, the government initiated a new framework for energy efficiency by utilising the NEM; however, it resulted in increasing GHG emissions in Australia (Crawford et al. 1996).

Another critique of climate policy concerns was the overall financial commitment to climate change policy. Australia invested around AUD3.5 billion over the period 1997-2007, since it first committed AUD180 million in 1997 (AGO. 2007). This was acknowledged as a huge investment for climate change policy at the time. However, it has finally been shown that Australia's investment has been lower than other developed nations, at $4 per capita being well below the United States and Japan (Pollard 2003).

Christoff (2005) argues that the consequences of inadequate policy will be climate-related ecological catastrophes with a number of environmental negative impacts in Australia such as droughts, coral bleaching and the devastation of the Great Barrier Reef and expected mass extinctions of native flora and fauna. These elements thus need strong national abatement policies or strong demands to set strong targets internationally. Furthermore, current measures aimed at significant GHG abatements with minimum cost risks have shown no significant effects on the Australian domestic climate or energy policy (Christoff 2005). This suggests that appropriate action on Australia's climate change policy is critical to protect the environment and prevent negative impacts.

Sullivan also acknowledged that in terms of domestic climate policy in Australia, the efforts during Howard's term were neither equitable nor cost-effective. Although the government announced expansion of existing measures (i.e. the Greenhouse Challenge Program) and a number of new sectoral strategies with new regulatory factors to assist implementation, the basis of government policy as 'no regrets' and voluntarism, was not sufficient to achieve reduction targets (Sullivan 2005). Furthermore, although the government invested a high level of funding in national climate policy approaches, 'no regrets' and voluntarism remained predominant in trading and economic affairs and brought benefits to the government's own interests (Crowley 2007).

4.4.4 Lack of global challenge

Another critique of Australian climate change policy is a lack of universal coverage. At the national level, two significant regulatory tools were also considered over the period 1997-2007. These were a tax system and a trading scheme. However, neither ever occurred (despite consultations for a trading scheme and reports prepared at state level) over that time. Hunt criticised the Howard government's policy actions as costly, ineffective and burdensome to the tax payer, and suggested that the government's adopting of an economy wide tax or allowance of a trading scheme would be a sound decision for further emission reduction (Hunt 2004). Reflecting on this position causes one to wonder why a government committed to market liberalism did not follow this way. However, its priority was to secure their coal industry and to trade energy by using modified market styles and by enforcing their preference. As a consequence, the Howard government's 'no regrets' or least or no economic cost policies resulted in emphasising voluntary initiatives (Crowley 2007). Thus the dominance of voluntarism as a policy instrument is highly criticised, because of its weakness, ineffectiveness and incapability to comply, with only for example 10% of publicly listed companies reducing their GHG activities as a result (CWLTH. 2000).

In the absence of policy comprehensiveness, the risk that individual states would have different targets or engage in unnecessary competition with each other significantly increased, without any help from the national government. These resulted in the state jurisdictions tending to become more independently active in international relations and likely to profit from multinational investments in the decade under study (Marsh et al. 2005). For instance, NSW achieved worldwide leadership for its greenhouse mitigation efforts over the decade. While the federal government did not accept trading schemes on a national scale, this state government initiated a practical solution for the first establishment of a government agency to produce the use and commercialisation of renewable energy as a trading scheme, which allows obtaining licences and trading credits, based on enacted legislation which settle carbon sequestration rights, as separate from traditional rights to land and timber (Forest NSW. 2005). In January 2003, NSW also successfully introduced the Greenhouse Gas Abatement Scheme [GGAS], one of the first mandatory greenhouse gas emission trading schemes in the world, which aims to contribute to reducing greenhouse gas emissions associated with production and electricity uses, and is expected to be achieved using projected-based action to offset the producing greenhouse gas emissions (IPRT 2006). Following these efforts, NSW further succeeded in creating positive trading methods for energy efficiency, by negotiation with other foreign companies. For instance, in July 1999, the Tokyo Electric Power Company contracted with State Forests of NSW to establish 1000 hectares of new forest in the year 2000 with plans projected for a proceeding program of between 10,000 and 40,000 hectares over the next ten years. At the same time, NSW also attempted to lead initiatives for greenhouse gas emissions with other states in Australia (Lyster 2004).

4.4.5 Intergovernmental issues

A further issue with climate change policy under the Howard government was the form of the ineffective integration at the intergovernmental level, in particular the relationship between federal and state governments. It was considered a fundamental change for the institutional corporation that needs to be adjusted between these two jurisdictions over time. Marsh and Yencken (2005) criticised the weak provision for better determination based on joint collaborations, associated with joint ministerial councils between the Prime Minister, state minister and chief ministers. There is the Council of Australian Governments (COAG) which provides additional formal relations between the Commonwealth and states and territories, however, this device encountered significant limitations in terms of deliberation. In terms of reasonable solutions, it is often the case that high level bodies such as COAG do not institutionalise interests as people wish they would. Such joint bodies at the top are typically seen to be effective only in order to delay a final policy decision (Marsh and Yencken 2005).

Crowley (2007) criticised the gaps between instrument uses of the federal and state governments for reducing GHG emissions. For instance, in terms of the federal government proposing national program implementation with other jurisdictions, only NSW entirely followed the federal government's initiatives in greatly reducing emissions. In the energy sector, 3.3 Mt CO_2-e of mitigation was scheduled and projected to be achieved from energy efficiency and stationary energy by the federal government. Nearly half of the total abatement (20Mt CO_2-e out of 47Mt CO_2-e in the energy sector) was achieved by states' jurisdictions mainly with regulatory measures (reported in the national report); the large number of voluntary measures accounted for only approximately 2-6MtCO_2-e of the federal government programs including the GCP for industry, greenhouse and energy efficiency programs. Regulatory measures have also been considered by the federal government, but only one such measure has been adopted on an entirely regulatory basis which was the MRET, projected to achieve abatement of only 6.6 Mt CO_2-e (Crowley 2007), nearly one eighth of the projected total abatement in the energy sector, as a compulsory compliance within all the jurisdictions for the reduction of greenhouse gas emissions. In a broad sense, there are also a number of regulatory programs used by the national government. These include: efficiency standards, building codes, labelling, fuel quality regulations and licensing agreements, however, these efforts are mostly in conjunction with state jurisdictions.

Another failure was insufficient application of funding for mitigation, namely, at the local scale, for example as occurred with the 'Cities for Climate Protection' program which was being sponsored by the federal government, and was aiming to associate with local government. Especially, in the case of funding money for establishing a 'local government action module', the federal government's support was justified in terms of greenhouse gas policy action. However, there were also a number of critiques of the program which saw it as 'Business As Usual', with too much focus on economic solutions (i.e. cost effectiveness, and the rationale of additional economic benefit). This emphasis resulted in the significant absence of other accomplishments such as environmental benefits, which are high priorities for greenhouse action, and will also be necessary for more decision making with respect to transport, development and energy. Therefore, the national government should strongly support other jurisdictions, otherwise these jurisdictions would not be able to achieve meaningful actions (Bulkeley 2000).

4.4.6 Confusion of inventory data, their concepts and projection

There has also been uncertainty regarding inventory systems to account for GHG emissions. As mentioned before, there are two inventory systems in the UNFCCC to account for the amount of GHG emissions in each nation. In terms of meeting Kyoto's differentiated targets, Australia has been expected to meet its target (+8% Kyoto target) in the first periods using the Kyoto accounting system. Australia has been on track to meet its targets without having to reduce GHG emissions, indeed with energy increases being offset by high levels of land clearing decrease since 1990 (DCC 2008c). However, the results would be different if measured by the UNFCCC accounting system. In fact the two national inventories have reported the differences. By using Kyoto accounting, Australia reported 576.0Mt CO_2-e in 2006 against 552.6Mt CO_2-e in 1990 representing emissions increasing by 4.2% (DCC 2008c) On the other hand, the UNFCCC accounting measured 549.9Mt CO_2-e in 2006 against 515.9Mt CO_2-e representing a 6.6% increase (DCC 2008b). The major reason for the gap was exclusion of the forestry sinks in Kyoto accounting (DCC 2008c). The Kyoto rules allow the LULUCF to be counted, namely a decrease of 53.9% over the period 1990 to 2006, which contrasts energy sector increases of 40% over the same period; industrial processes also increased 17.7% over the 1990 to 2006 period under both the UNFCCC and Kyoto accounting (DCC 2008c).

There is another critical aspect which should be recognised in the national inventory regarding land clearing. Hamilton (1999) acknowledged that there were still huge uncertainties under the emission inventory for land clearing in Australia, though the country is one of the world leaders in this research area (Hamilton 1999). The major concern was based on the accuracy of land conversion data. Hamilton also considered the fact that decline in emissions from land clearing will allow emissions from fossil and other sources to be able to increase by 22% and 33%, well above the total 8%

Kyoto target (Hamilton 1999). Furthermore, since the fourth inventory for the national emission data was submitted, it can be seen that the basis of the accounting to comply with rules from UNFCCC to Kyoto Target has changed. This signifies, seemingly, that the results showed that Australia still remained on track for its Kyoto target of an average of 108 per cent of 1990 emissions levels against the first commitment period without any further actions (Macintosh 2007). Given this background, it was only the emission offset from the LULUCF sector which encouraged Australia to meet its Kyoto target. It is thus imperative that the inventory data, particularly for this sector, should be as accurate as possible. However, uncertainty has been raised about the veracity of the estimates of emissions from the LULUCF sector based in particular on incompatible data between the Federal and Queensland Governments' land clearing data (Macintosh 2007). The Federal Government's National Carbon Accounting System (NCAS) first appeared in the National Greenhouse Gas Inventory in 2000 (NGGI). A concern was raised in relation to the fact that the estimated rate of land clearing of 33% in 1990 was higher than the estimate in 2000 NGGI. This shows that the results of estimation under the NGGI were changed and not consistent over time

Another uncertainty is the discrepancy of data results between NCAS and the Statewide Landcover and Trees Study (SLATS) which is Queensland's estimate data for land clearing. Approximately 70% of the development of land clearing in the total emission in Australia is associated with Queensland. However, the data from SLATS in Queensland and from NCAS in the Federal government reported different land clearing rates. According to the results from the SLATS between 1989/90 and 2000/01 it was approximately 50 % higher than the amount estimated by the NCAS. Significant differences in the trends were identified, with peaks in clearing shown in the SLATS data in the late 1990s and early 2000s not evident in the NCAS results. The Australia Institute argues that the NCAS is not transparent, because the NCAS's land clearing results are not publicly available (e.g. no publicly available map of the areas that have been classified as Kyoto forests; no published maps that identify where clearing is occurring). In contrast, details published by SLATS show clearing maps, and many of its datasets are also included in its reports or are available on request. The NCAS therefore appears to have a lack of information, and it is not possible to properly compare its outputs against those from SLATS. There is insufficient publicly available information on the NCAS to enable a meaningful comparison between the NCAS and SLAT land clearing results to be carried out. Therefore, there is significant uncertainty over land clearing rates in Australia (Macintosh 2007).

There are huge uncertainties, therefore, about the federal government initiative in terms of strategy for meeting their emission reduction targets and the Kyoto targets, such as adapting differentiated targets, and meeting the targets for the nation. The economy is highly dominated by fossil fuels and, whilst the economy has expanded, so have emissions offset by significant credits from land clearing and which in effect have protected the coal industry (ACCI 1997). Furthermore, projections under the approaches of the Howard government are estimated on baseline information with the Business As Usual [BAU] projections to 2010. This BAU, however, is based on a weak target system (Curran 2007). Beside these uncertainties, another significant factor concerns the national reports provided mandatorily by the AGO to the UNFCCC for the global responsibility. Crowley (2007) indicated that the national method for the reports in the periods had been changed over the decade. New abatement measures were also expected in future to achieve desired targets, and their impact was demonstrated in a recent National Communication Report (Crowley 2007). In addition to her recognitions, there are huge uncertainties in projections with the numbers of policy programs projected based on the BAU. The latest report in 2005 showed each policy program was projected on the BAU basis and was illustrated from cross-sectoral and sectoral perspectives. These are expected to reduce certain amounts of emissions by following certain assumptions. In particular, the projection for the energy sector is very controversial as the highest emission producer, and projected to be achieved on the BAU by reducing 47Mt CO_2-e, which involved: 37.6 Mt CO_2-e in stationary energy, 2.2 Mt CO_2-e in transport and 7.2 Mt CO_2-e in fugitive emissions (Crowley 2007). On the basis of these efforts, it was shown as expected that targets would be completed for all programs in all other jurisdictions (AGO 2004b) because the targets at the national level would not be achieved without initiatives from each state jurisdiction.

4.4.7 Suggestions by the formal institutions

Other critiques were the low level of government's response to issues addressed by institutions over the period 1997-2007. In November 2000, when *The Heat is On: Australia's Greenhouse Future* was published, one of the strongest suggestions was about the cost ineffectiveness and inadequacy of climate program delivery, particularly for the GCP based on voluntary initiatives (CWLTH 2000b). Following these points, the AGO's independent progress report was presented and similar criticisms made in 2002. In essence, under the AGO concept, a program delivery is a significant challenge for the AGO, and it also required designing a successful program and promoting effective implementation. However, the 2002 AGO's *Independent Report* again addressed the need to adjust the lack of progress reports for implementation delivery, and the insufficient integration with other agencies. Furthermore, the independent review was committed to regularly reporting but was not released after the 2002 report. Despite this fact, descriptions of a number of the programs undertaken by various stakeholders were well addressed following the guidelines. However, it also addressed the concern that most of these programs had unrealistic targets. For instance, the current expenditure patterns and budget allocations showed self management, freed from the initial pressure to deliver. A more realistic pattern would need program administrators and also the recipients of the funding to receive and conduct actions to meet their targets. Thus, there was a need to improve the insufficient implementation framework for the policy to be supported by the national government to revise instrument use design, which could have resulted in an effective policy (AGO 2002d).

Following these events, in 2004, the Australian National Audit Office [ANAO] evaluated and criticised a variety of the issues of the actions under the AGO, including: inadequate, ineffective and inefficient management under the federal implementation; and unsatisfactory progress toward reaching their targets of GHG mitigation (ANAO 2004). While the ANAO acknowledged the necessity of improving transparency and public accountability to the AGO, the ANAO indicated lack of transparency under the program by the Greenhouse Challenge Program, which had already been restated in the year 2000 in *The Heat is On: Australia's Greenhouse Future* report (CWLTH 2000b). The ANAO also reported that most of the issues found in the report were unsatisfactory in the articulations for their trends of the implementation progress and changes over time in the AGO's reports (ANAO 2004). However, the federal government did not take these recommendations seriously into account. Following the event, a Senate Review Committee also indicated and suggested a range of significant issues, with particular emphasis upon some unsatisfied considerations for further actions of 'no regret', and no cost measures. However, the government finally refused to adopt this advice given by the committee (Lyster 2004).

Another suggestion concerned the insufficient implementation of the federal climate change activities. COAG identified the unsuccessful policy outcomes for energy efficiency. The reasons were based on failures including: the low cost of energy generation; immature market for gas prices; and irrelevant setting of emissions prices. However, most of these reasons identified that electricity restriction for implementation caused incomplete implementation delivery, due to the limited enforceability (MacGill et al. 2007). Moreover, the fundamental issue was also reported in *Australian Climate Change Research* in 2007. It required establishing a better framework for strategic planning, effective policy process and enhanced collaboration with other jurisdictions for the national climate change activities (CWLTH 2007e). During the Howard regime, appropriate program delivery was conducted under federal initiatives over time, yet a number of suggestions by formal institutions were not being taken into the consideration. Furthermore, it was obvious that there was a range of uncertainties for the relations between the instrument designs and their implementations, including: weak power; unclear targets; absence of the significant climate instruments; and misleading financial instruments. These resulted in ineffectiveness, inefficiency and lack of transparency and identification of instrument productivity, unsatisfactory progress towards reaching targets in terms of demanding a successful GHG emission mitigation policy by the Australian government.

4.4.8 Summary

Over the period 1997-2007, for implementation with respect to climate policy in Australia, there are a number of shortcomings identified here as implications for policy failure, namely: unclear targets, weak actions, inappropriate adaptation of climate policy instrument uses, the failure of global integration, a lack of methods for legitimately identifying progress and insufficient policy analysis methods.

An application of an instrument analysis to Australia over the period 1997-2007 is highly significant in terms of developing improved policy activities for climate change not only in developed nations but also in developing nations such as Australia. One of the most critical reasons for this study is to examine climate change policy in Australia, one of the most carbon intensive countries and how it was a better design policy. Although the total national emission level is small compared to other developed nations, Australia is one of the highest carbon per capita emitters in the world. Moreover, during the decade studied, Australia and the United States were the only countries failing to ratify the international binding agreement for reducing GHG emissions. Furthermore, the approaches under the Australian government over time were highly criticised in terms of reliance on voluntary based instruments. Therefore, there is a need to evaluate in more detail how particular policy instruments were designed and implemented over the period and to examine the extent to which the government's approaches met their set targets, and therefore to reflect on the effectiveness of the 'no-regrets' principle and voluntary approach.

4.5 Conclusion

Through this chapter, the main purpose was to illustrate a clear recognition of the background and significance of Australian greenhouse policy activities at the national level over the period 1997 - 2007. This thesis selected four major aspects in order to meet the objectives; namely: national circumstances, emission records, the history of Australian climate change policy and critiques of instruments and policy.

Each of these perspectives also presented a number of critical backgrounds under the policy activities during the period, namely: unique circumstances in the world in terms of leading the global responsibility as a developed nation due to the rapid population growth and land use patterns; Australia as one of the most carbon intensive nations; large financial commitments under the policy during the time without taking global responsibility such as the Kyoto protocol; the basis for voluntary initiatives rather than restrictions on activities and huge uncertainties under the policy framework such as the 'no-regrets' principle, inventory, projection and intergovernmental integration. Given this background, the application of the policy instrument analysis to the national initiatives under the Australian greenhouse policy during 1997 to 2007, is a critical study and will be very useful not only for carbon intensive nations and developed nations but also potentially for other nations.

The following chapters now examine the case study of Australian Greenhouse Policy during 1997-2007 to fulfil the second aim of this thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the two methods developed (Identification & Trend Analysis/ Method, and Effectiveness Analysis/ Method) in the first aim.

In the empirical case study, two methods are demonstrated, which are developed in Chapters Two and Three, namely: Identification & Trend Analysis/ Method to classify and identify trend use of soft and hard instruments; and Effectiveness Analysis/ Method to examine the effectiveness of 'soft' and 'hard' instruments in a policy which aims to reduce GHG emissions. Identification & Trend Analysis/ Method assesses how the Australian government allocated their adoption of 'soft' and 'hard' instruments in terms of reducing GHG emissions during 1997-2007. Effectiveness Analysis/ Method addresses the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions. Case study analysis provides some useful empirical data to determine the relative effectiveness of 'soft' and 'hard' instruments in the case of Australia's climate change policy during 1997-2007, and allows for some conclusions to be reached regarding the influences of 'soft' and 'hard' instruments in terms of reducing GHG emissions, which may subsequently be considered more generally.

Chapter Five demonstrates the use of Identification & Trend Analysis/ Method in assessing how the Australian government allocated their adoption of 'soft' and 'hard' instruments in terms of reducing GHG emissions during 1997-2007. This analysis demonstrates trend use of 'soft' and 'hard' climate policy instruments during the period. Chapter Six then demonstrates the use of Effectiveness Analysis/ Method in addressing the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions in Australia's policy.

Chapter Five

'Soft' and 'Hard' Policy Instruments, 1997-2007

5.0 Introduction

This chapter demonstrates the utility of the Identification & Trend Analysis/ Method in illustrating the trend use of 'soft' and 'hard' climate policy instruments in Australia's climate policy during 1997-2007, in order to fulfil the second aim of the thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by applying the methods developed in the first aim. The results in this chapter allow this thesis to address how the Australian government allocated their adoption of 'soft' and 'hard' instruments during 1997-2007 in terms of reducing GHG emissions.

The Identification & Trend Analysis/ Method comprises two approaches established earlier in this thesis, namely: CCPIC for classifying climate policy instruments and DSHCI for distinguishing between 'soft' and 'hard' instruments in climate policy. Thus, this chapter applies the Identification & Trend Analysis/ Method in order to establish the trend use of 'soft' and 'hard' instruments (i.e. CCPIC and DSHCI approaches) and provides an analysis of its empirical findings.

This chapter considers three themes: a) the types of policy instruments utilised by the Australian government during the period 1997-2007; b) how such instruments vary according to the criteria developed in this thesis for assessing 'hard' and 'soft' policy instruments; c) and what the trend of usage of such instruments was over time. The results show 'mixed instruments' were highly dominant in national approaches, a dominance which tended to increase over the period.

The data collection used for the Identification & Trend Analysis/ Method is based on national communication reports in 2002 and 2005 by the Australian Government to the UN. The two national reports are critical for illustrating government initiatives between 1997 and 2007. Each communication report listed a number of initiatives and described their implementation, but some were incomplete and were never implemented during the period. Thus the process of data collection presented some difficulties for this analysis, although, concurrently, select interviews were conducted and meetings were held with several relevant bureaucrats in relevant areas of the federal government. These meetings provided useful advice and material, such as additional measures not included in the communication reports up to 2007, to supplement the data collection.

The following chapter is divided into a number of sections, which correspond to the three objectives stated above. Firstly, this chapter presents the results of instrument use under national initiatives over the period 1997-2007 at the national and sectoral level. Secondly, the chapter then examines whether such instruments were 'soft' or 'hard' according to the criteria developed in this study and applied here. Then this chapter concludes with the first aspect of the case study to demonstrate the Identification & Trend Analysis/ Method for illustrating trend use of 'soft' and 'hard' climate change instruments in Australia during 1997-2007.

5.1 Results Instrument Categories

5.1.1 Six instrument categories

Firstly, in order to examine what policy instruments were distributed by the national government during the period 1997-2007, we must recall the CCPIC approach, which was established here in Chapter Three. In terms of classifying policy instruments, the CCPIC approach developed in this thesis has included six instrument categories, namely; economic, regulatory, voluntary, R&D, information-based and mixed instruments. These categories are based on the categories in the national communication reports. This thesis calls 'mixed instruments' those which were classified as various instruments in the national reports. Mixed instruments indicate that an introduced program consists of more than one instrument (e.g. economic and regulatory, or voluntary and R&D). Table 5.1: (below) describes the basic instrument classification. Each description in the table provides a clear picture of the different characteristics of each instrument type.

Table 5.1: Policy Instrument Categories for Climate Policy

Instruments	Elements
Regulatory	Technological standard : Rationing and prescription (e.g. Emission quota, mandatory technologies and procedures) Performance standards and benchmarks (e g total material requirement and building performance standards) Financial penalties for non-compliance
Voluntary/and negotiated agreement	Voluntary participation, initiatives, and activities Negotiated agreement between emitters, between emitters and government
Economic	'Incentives' includes subsidies, grants and loan exemptions 'Disincentives' include. emission tax and charges, and carbon emission trading permits and quotas
Research	Research and Technology Development
Information-based instrument	Education, training, awareness and campaigns, publication availability.
Mixed	Combined more than one single instrument

The following section examines how these six instruments were used in Australia during the period 1997-2007.

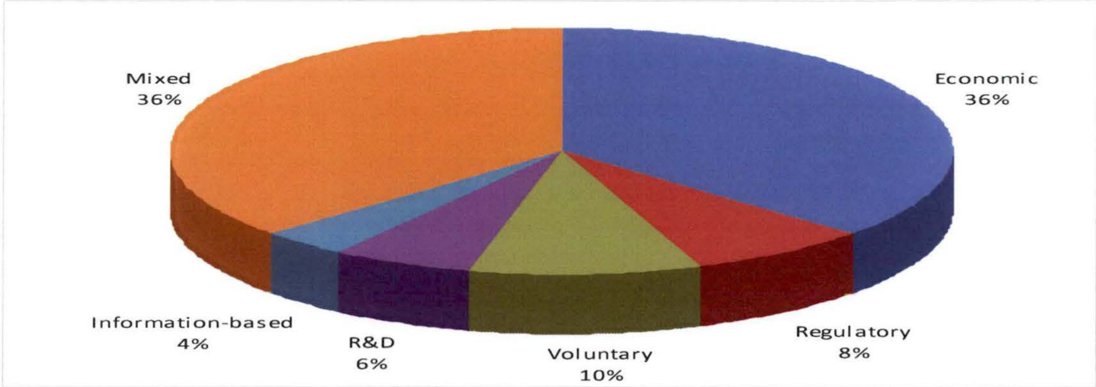
5.1.2 Policy Instruments at the National Level 1997-2007

5.1.2.1 Policy instruments at the national level 1997-2007 (exclusive of state instruments)

Figures 5.1 and 5.2 display the national initiatives between 1997 and 2007 divided into the six instrument categories. In Figure 5.1, mixed instruments made up 36% of the total instrument uses over the period 1997-2007. This clearly indicates that, during the period, a large number of programs under the national initiatives were associated with more than one instrument. In terms of single instrument types[30], economic instruments demonstrate the highest percentage of the total national initiatives at 36%, followed by voluntary (10%), regulatory (8%), information-based (4%), and R&D instruments (5%).

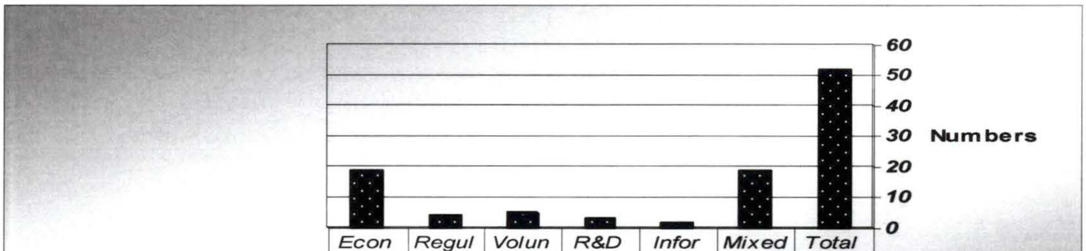
[30] A program consists of one instrument (e.g. regulatory).

Figure 5.1: Policy instruments at the national level by percentage, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.2: Policy instruments at the national level by number 1997-2007



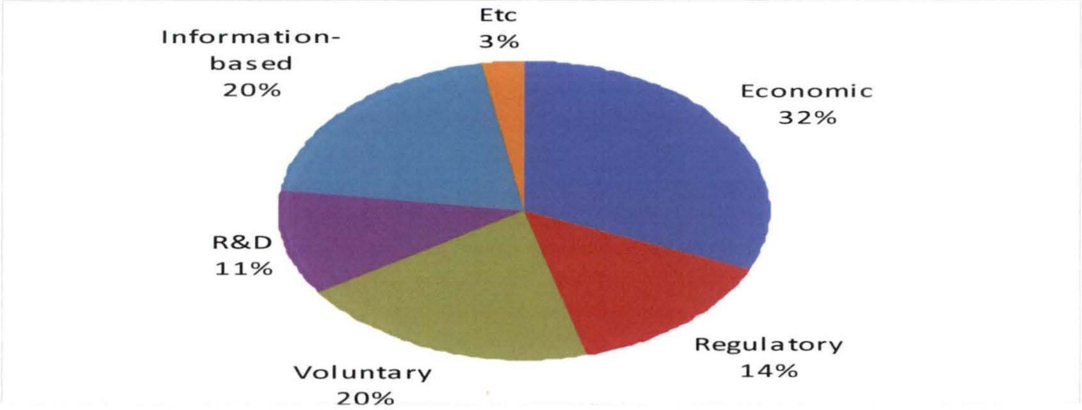
	Econ	Regul	Volun	R&D	Infor	Mixed	Total
National Initiatives 1997-2007	19	4	5	3	2	19	52

Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.2.2 The details of mixed instruments at the national level 1997-2007

Figure 5.3 presents the distribution of mixed instruments. The use of economic instruments in the mixed instruments found the highest rate at 32%. Information-based and voluntary instruments had relatively higher usages than other instruments both at 20%: regulatory (14%) and R&D instruments (11%). In addition, 'etc' at 3% indicates non-availability of detail in government reports[31].

Figure 5.3: Details of the mixed instruments at the national level, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

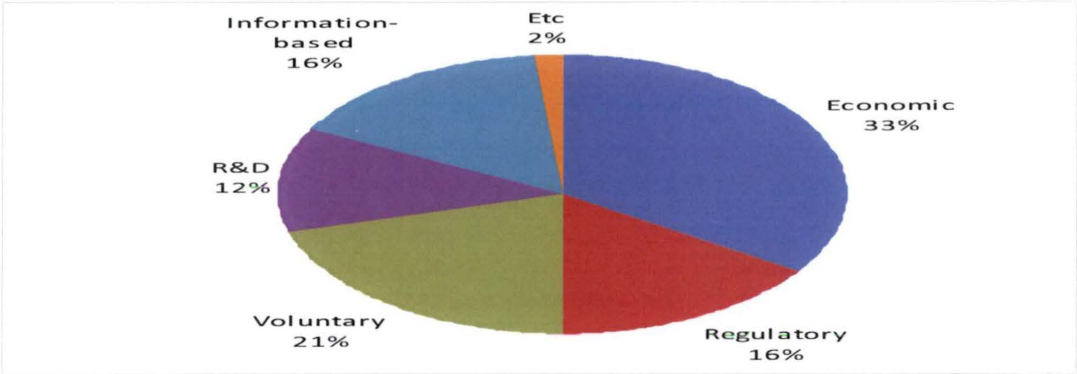
*In the figures, "etc" refers to "mixed instruments" which are not specified in detail within official reports.

5.1.2.3 Policy instruments at the national level 1997-2007 (including the details of mixed instruments)

Figure 5.4 gives the usage of total instruments at the national level over the period 1997-2007, including the details of mixed instruments. The use of economic instruments again found the highest rate at 33% in total. Voluntary instruments also showed relatively higher than other instruments at 21%, followed by information-based and regulatory instruments (16%), R&D instruments (12%) and etc (3%).

[31] A program was indicated as a use of various instruments in the Fourth National Communication Report to the UN reported in 2005, thus acknowledging 'etc'.

Figure 5.4: Policy instruments at the national level, 1997-2007, including the details of the mixed instruments



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

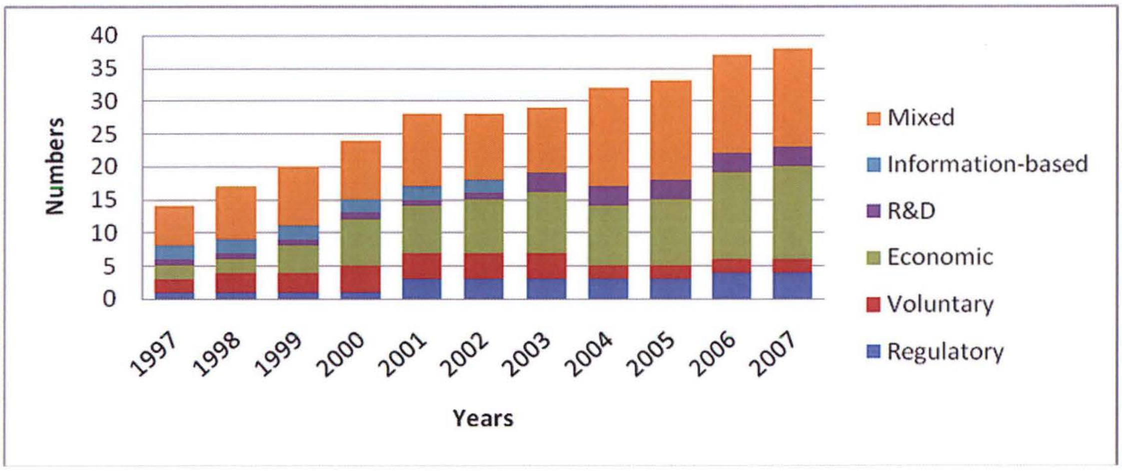
5.1.3 Trend Uses at the National Level 1997-2007

The following section will demonstrate how the government allocated these six instruments during the period. The data collection of the figures below is based on national communication reports from 2002 and 2005 by the Australian Government to the UN. Additional data was obtained by interviews with several bureaucrats in relevant areas of the federal government. These meetings provided useful advice and material, such as additional measures not included in the communication reports up to 2007, to supplement the data collection.

<u>5.1.3.1 Instrument trend uses under national initiatives 1997-2007</u>

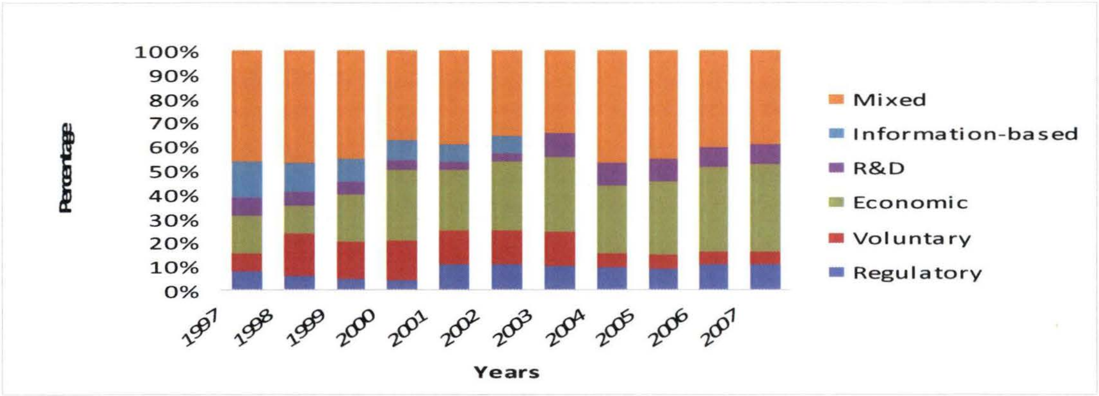
Figure 5.5 demonstrates the instrument trend use under national initiatives over the period 1997-2007. Firstly, the tendency of introducing mixed instruments significantly increased over the decade. In terms of single instruments, the use of economic instruments showed a tendency to increase rapidly during the period. In addition, the usage of R&D and regulatory instruments also tended to rise gradually, while the number of information-based and voluntary instruments demonstrated a tendency to decline over time. Figure 6 presents the trends by percentage during the period.

Figure 5.5: The instrument trend uses at the national level, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.6: Instrument trend uses at the national level by percentage, 1997-2007

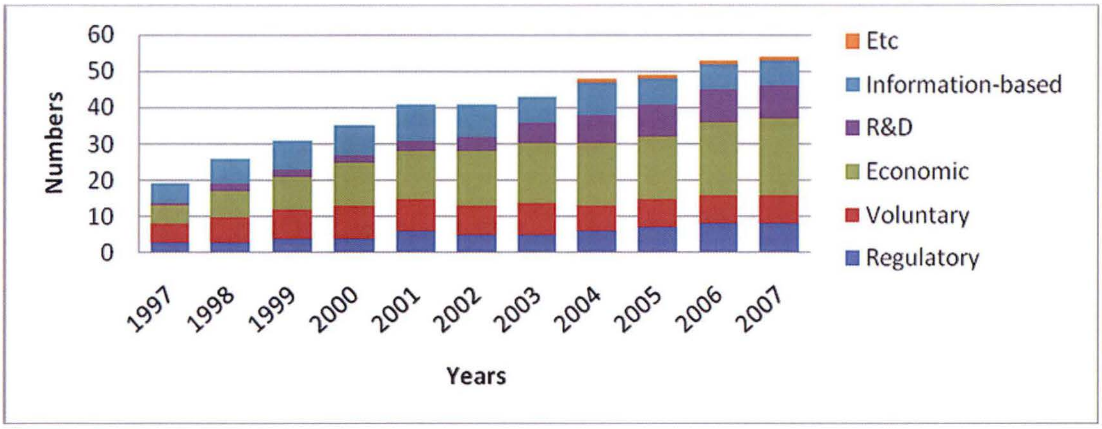


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.3.2 Trend use of policy instruments under the national initiatives 1997-2007

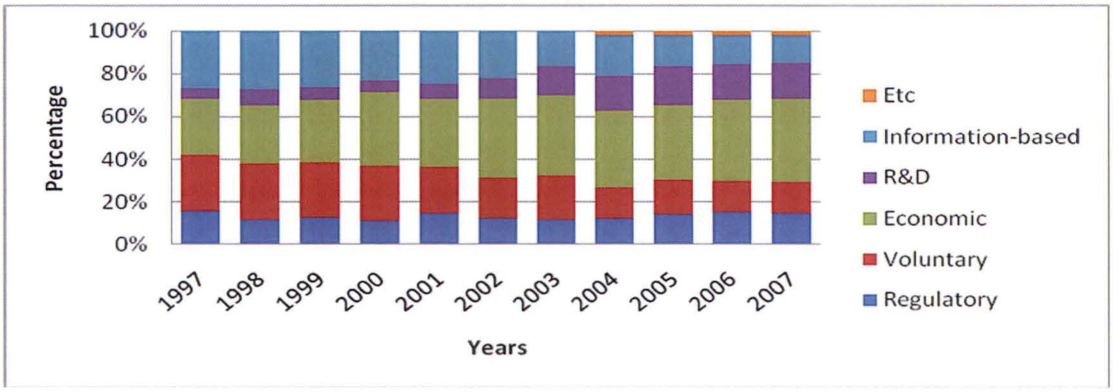
Figure 5.7 displays the trends of the total initiatives under national initiatives over the period 1997-2007, including the details of the mixed instruments. The number of economic instruments showed a tendency to increase significantly. While information-based and voluntary instruments tended to decline over time, R&D and regulatory instruments indicated a tendency to increase gradually. In particular, it showed a significant rise in the use of R&D instruments in the second half of the decade. Figure 5.8 also presents the trends by percentage during the period.

Figure 5.7: Instrument trend uses at the national level, 1997-2007, including mixed instruments



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.8: Instrument trend uses at the national level by percentage, 1997-2007, including the details of the mixed instruments



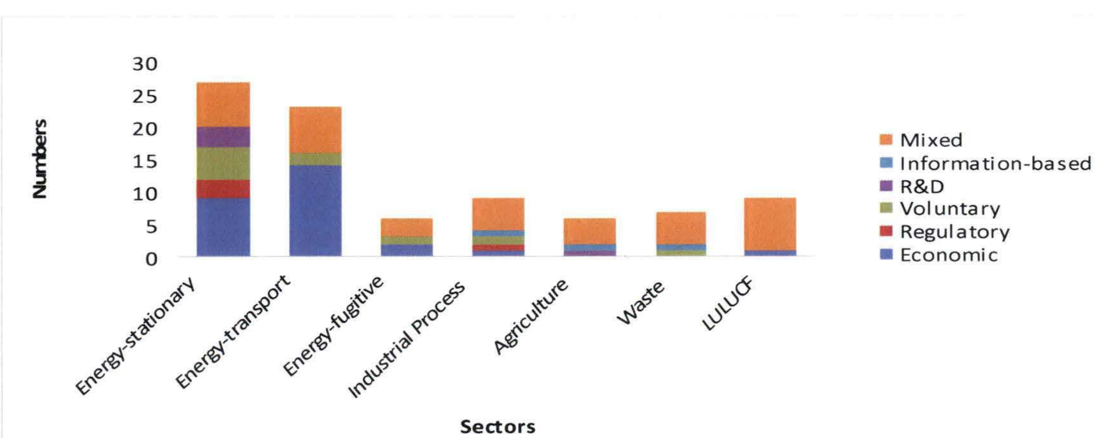
Sources: (AGO, 2002b; and 2005). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.4 Policy Instruments at the Sectoral Level 1997-2007

5.1.4.1 National initiatives at the sectoral level 1997-2007

Figure 5.9 presents the numbers of national initiatives at the sectoral level 1997 to 2007, including energy-stationary, energy-transport, energy-fugitive, industrial process, agriculture, waste and LULUCF. The number of initiatives under the sector of energy-stationary found the highest usage of the total initiatives, at 27 programs, followed by energy-transport, at 23. While there was a relatively high amount of introducing mixed instruments in each sector, a variety of single instruments were also found. Although showing a relatively low level of dominance in the three energy sectors (stationary, transport and fugitive), mixed approaches were largely dominant in the other sectors.

Figure 5.9: Policy instruments at the sectoral level 1997-2007

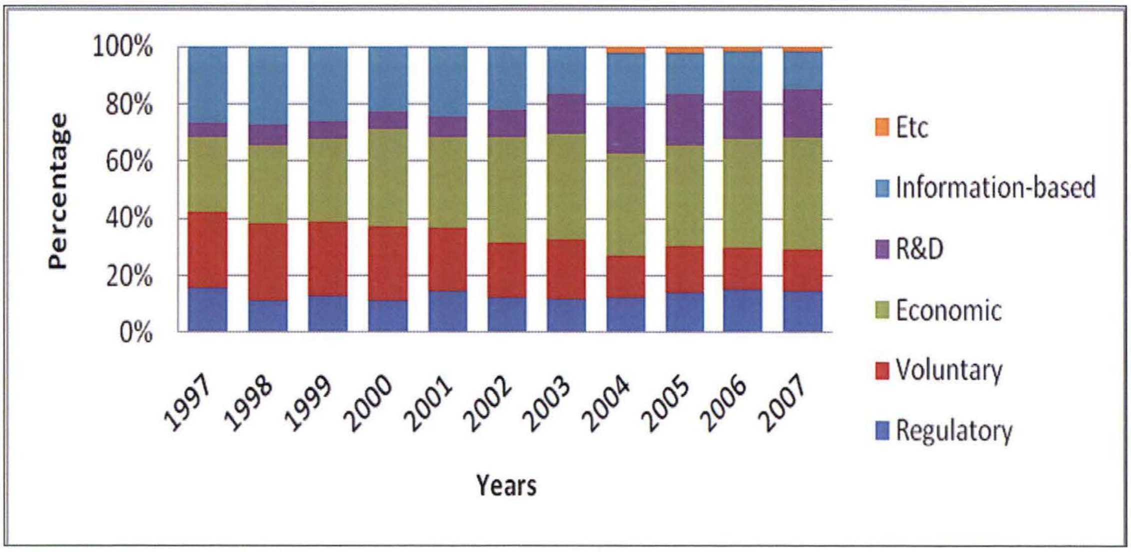


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia

5.1.4.2 National Initiatives at the Sectoral Level 1997-2007 (including mixed instruments)

Figure 5.10 illustrates the mean percentage scores of the national initiatives at the sectoral level over the period 1997 to 2007, including the details of mixed instruments. The proportion of the use of economic instruments in the energy-transport sector was the largest over the period at over 50%, compared to a relatively low percentage of regulatory instruments at approximately 5%, and R&D instruments at less than 5%, compared to other sectors. Furthermore, in the LULUCF sector, the proportion of information-based instruments was revealed as the highest amount over time at approximately 45%. In the same sector there also appeared to be a relatively high rate of economic instrument usage. However, the sector did not use regulatory instruments. Furthermore, a similarity of instrument use in the LULUCF was found in the agriculture sector. In agriculture, there was a high adoption of information-based and non-regulatory instruments. Furthermore, it was also revealed in the reports examined that the rate of introducing R&D instruments in this sector was the highest of all sectors. In the waste sector, the proportion of voluntary instruments indicated the highest rates over time at approximately 35%.

Figure 5.10: Instrument trends 1997-2007 at the sectoral level including mixed instruments



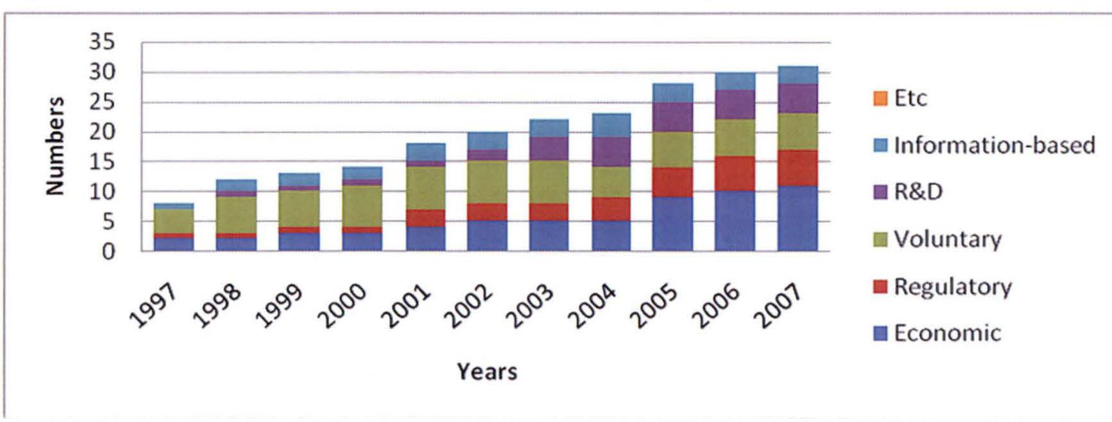
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.5 Trend uses at the Sectoral Level 1997-2007

5.1.5.1 Trend uses in the Energy-Stationary Sector1997-2007

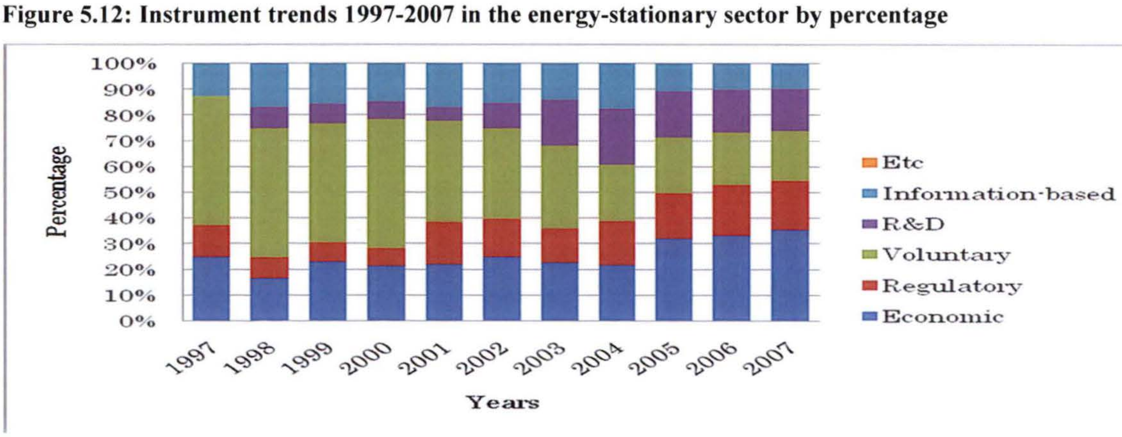
Figure 5.11 presents the trend uses in the energy-stationary sector over the period 1997-2007. The number of energy-stationary voluntary instruments was found to be the largest in the total national initiatives in the first half of the decade; however, it shifted so that usage of economic instruments had gained the highest dominance in the second half of the decade. While the number of voluntary and information-based instruments did not show significant changes during the period, the introduction of economic, R&D and regulatory instruments tended to increase dramatically in the second half of the decade. See Figure 5.12 which also presents the trends by percentage during the period.

Figure 5.11: Instrument trends 1997-2007 in the energy-stationary sector



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.12: Instrument trends 1997-2007 in the energy-stationary sector by percentage

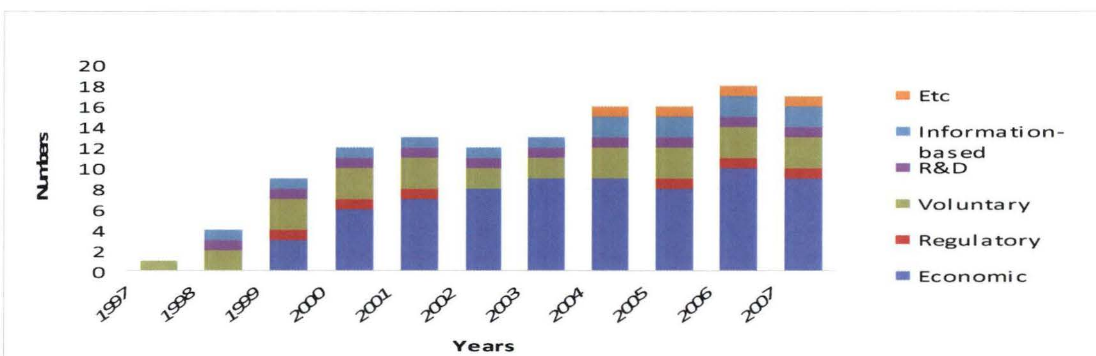


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.5.2 Trend uses in the Energy-Transport Sector 1997-2007

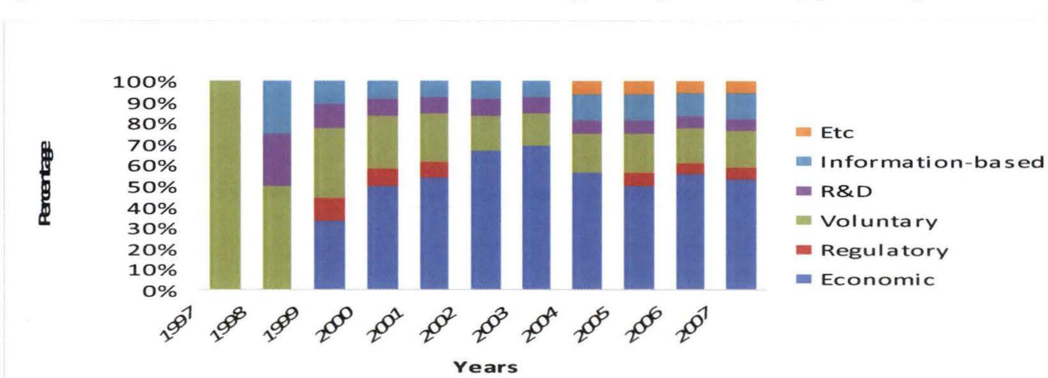
Figure 5.13 displays trend uses in the energy-transport sector over the period 1997-2007. As mentioned, the number of economic instruments in the sector during the period was found to be the largest of the total initiatives and showed a tendency to increase significantly over time, with other instruments remaining relatively stable. See Figure 5.14 which also presents the trends by percentage during the period.

Figure 5.13: Instrument trends 1997-2007 in the energy-transport sector



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.14: Instrument trends 1997-2007 in the energy-transport sector by percentage

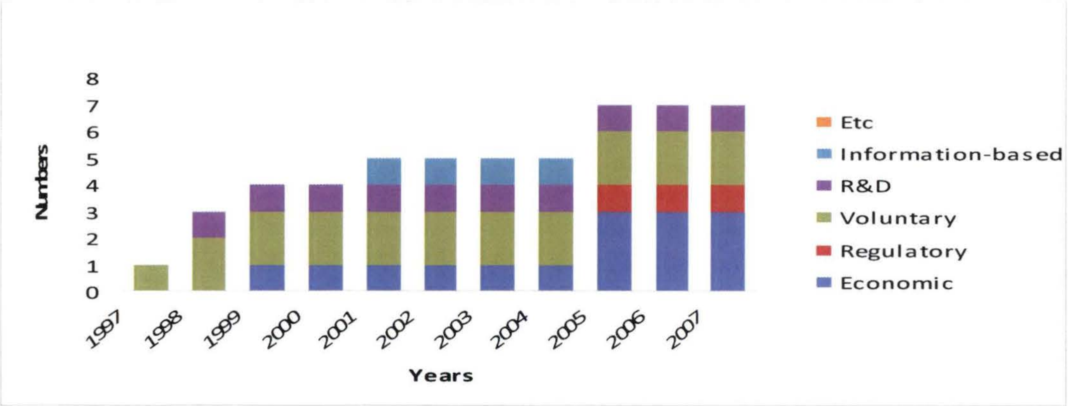


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.5.3 Trend uses in Fugitive Energy 1997-2007

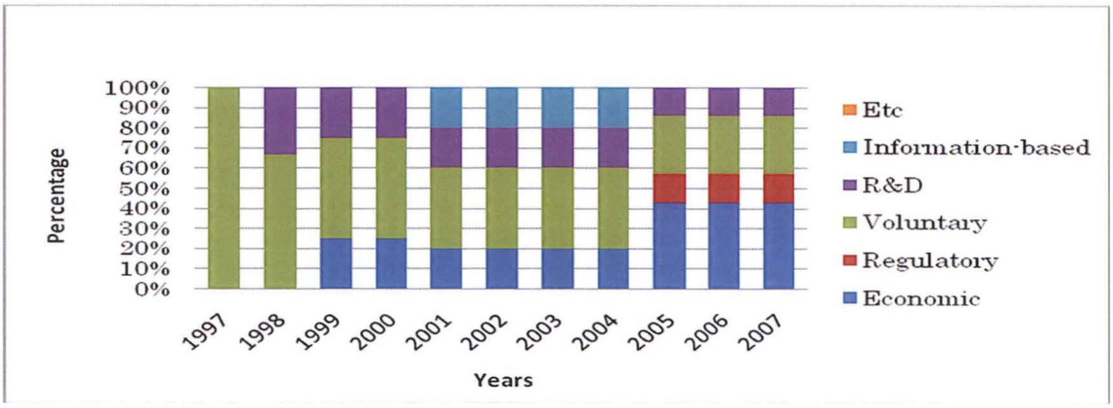
Figure 5.15 presents trend uses in fugitive energy over the period 1997-2007. Voluntary instruments largely dominated in the first half of the decade; however, economic instruments became more prominent initiatives in this sector in the second half of the decade. In addition, the introduction of economic instruments in the sector showed a tendency to increase dramatically in the second half of the decade, especially 2005-2007. After the use of information-based instruments was discontinued in 2004, regulatory instruments were introduced in 2005, while the R&D and voluntary instruments remained at relatively the same level through the decade 1997-2007. See Figure 5.16 which also presents the trends by percentage during the period.

Figure 5.15: Instrument trends 1997-2007 in fugitive energy



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.16: Instrument trends 1997-2007 in the fugitive energy sector by percentage

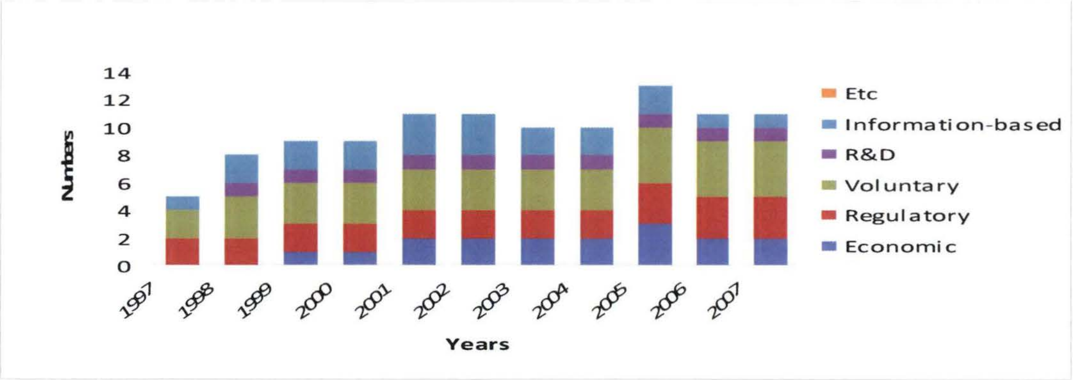


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.5.4 Trend uses in Industrial Processing 1997-2007

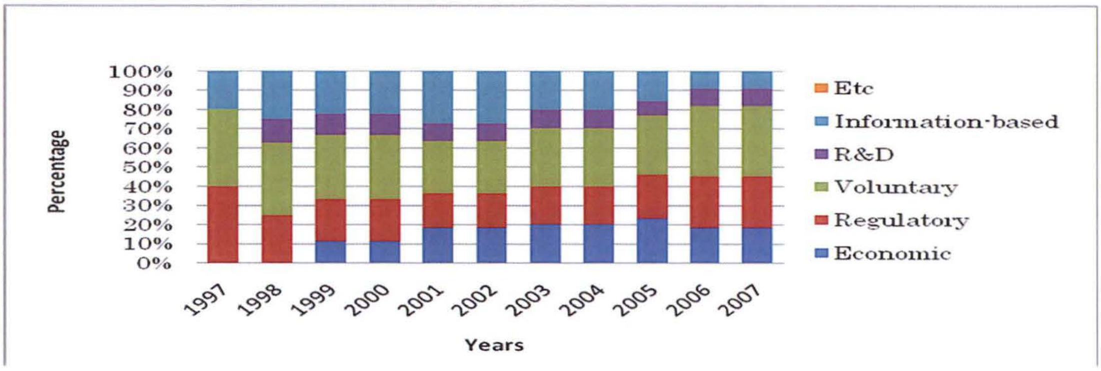
Figure 5.17 illustrates trend uses in the industrial processing sector over the period 1997-2007. The large number of initiatives under the sector was based on voluntary and regulatory instruments. The number of voluntary, regulatory, and economic instruments showed a tendency to increase gradually over time, while R&D instruments remained at the same level. The use of information-based instruments tended to decline over time, and also showed a significant decrease in the second half of the decade. See Figure 5.18 which also presents the trends by percentage during the period.

Figure 5.17: Instrument trends 1997-2007 in the industrial processing sector



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.18: Instrument trends 1997-2007 in the industrial processing sector by percentage

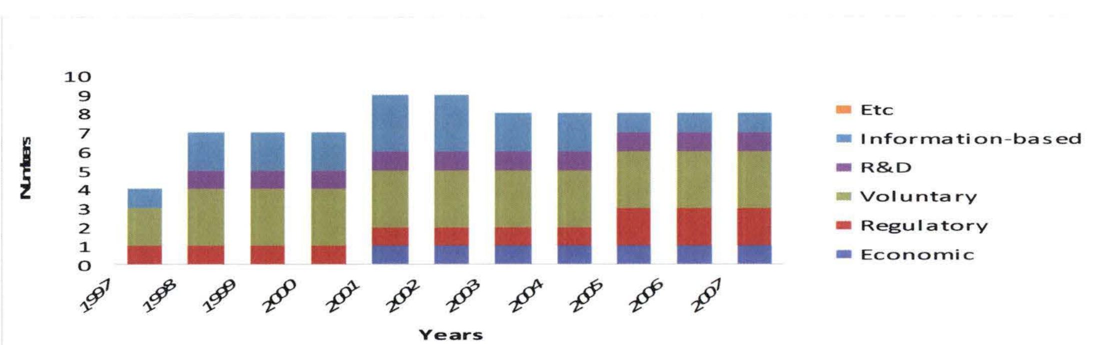


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.5.5 Trend uses in the Waste Sector 1997-2007

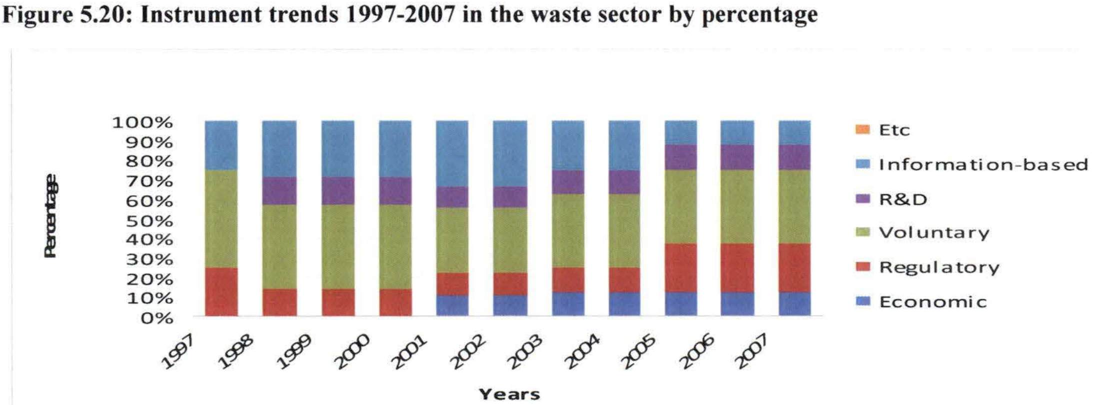
Figure 5.19 presents trend uses in the waste sector over the period 1997-2007. As mentioned, under the sector, the largest proportion of the national initiatives was based on voluntary instruments, which remained at the same level over time. In addition, the use of economic instruments under this sector was not popular during the period, compared to other sectors (see other sectors). Despite information-based instruments showing a tendency to decline over time especially from 2003, the use of regulatory instruments tended to increase from 2005. See Figure 5.20 which also presents the trends by percentage during the period.

Figure 5.19: Instrument trends 1997-2007 in the waste sector



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.20: Instrument trends 1997-2007 in the waste sector by percentage

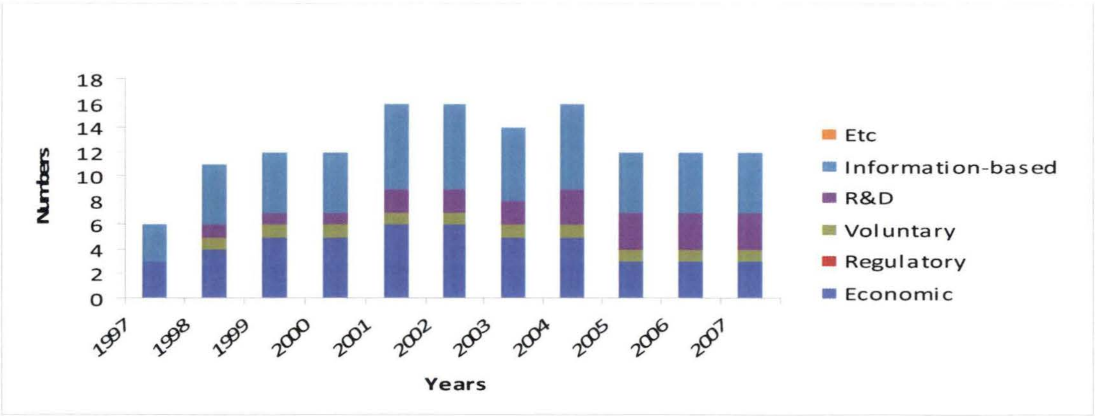


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.5.5 Trend uses in the LULUCF Sector 1997-2007

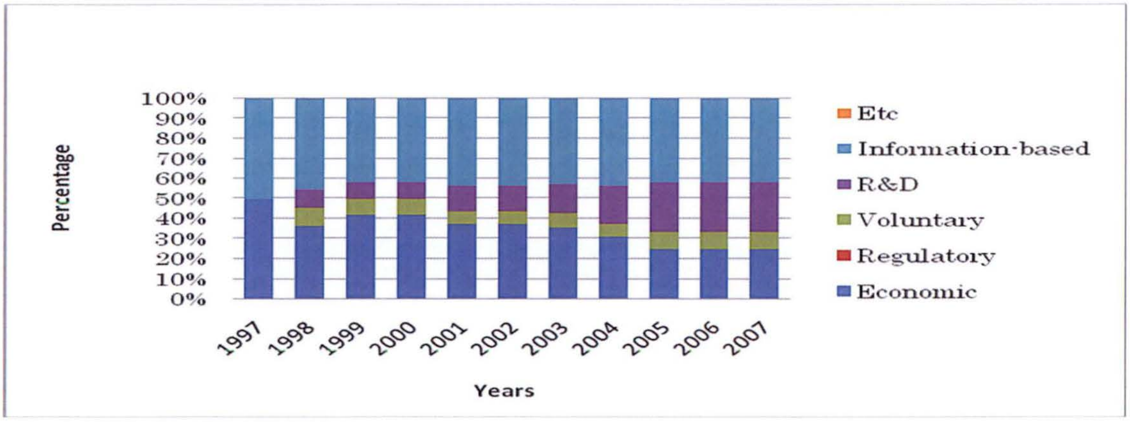
Figure 5.21 gives the trend uses for the LULUCF over the period 1997-2007. As mentioned, in this sector, there was no use of regulatory instruments. In this sector, the proportion of economic and information-based instruments was highly enhanced over time; however, the number of economic instruments showed a tendency to increase in the first half of the decade, and to decline in the second half of the decade after the peak of 2001-2002. Furthermore, while the information-based and voluntary instruments remained at relatively the same level during the period, the number of R&D instruments tended to increase dramatically. See Figure 5.22 which also presents the trends by percentage during the period.

Figure 5.21: Instrument trends 1997-2007 in the LULUCF sector



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.22: Instrument trends 1997-2007 in the LULUCF sector by percentage

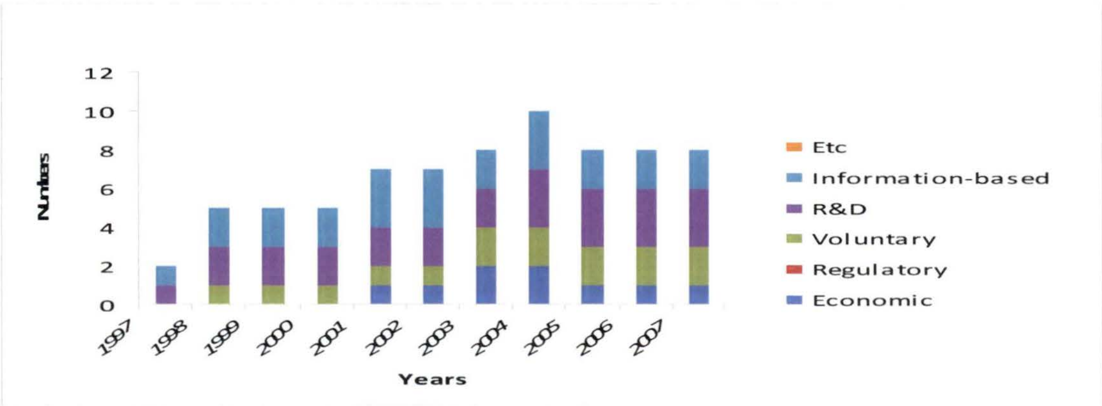


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.1.5.7 Trend uses in the Agricultural Sector 1997-2007

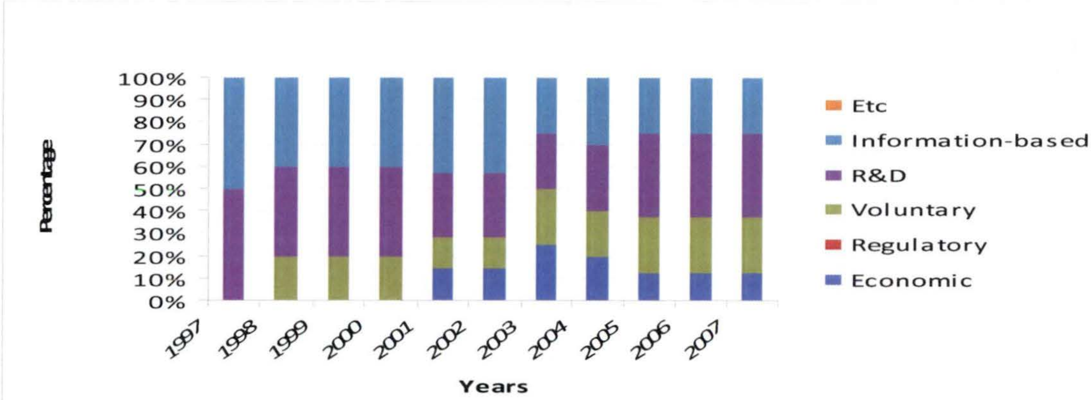
Figure 5.23 displays trend uses in the agricultural sector over the period 1997-2007. As mentioned, there was no use of a regulatory instrument. The use of information-based, R&D and voluntary instruments, under this sector, dominated initiatives over time. In particular, the number of R&D and voluntary instruments also showed a tendency to increase over time, while the use of information-based instruments remained at the same level. The usage of economic instruments increased dramatically from 2001-2004, but tended to decrease after the peak in 2004. See Figure 5.24, which also presents the trends by percentage during the period.

Figure 5.23: Instrument trends 1997-2007 in the agricultural sector



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.24: Instrument trends 1997-2007 in the agricultural sector by percentage



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2 Determining Soft and Hard Instruments

5.2.1 Criteria for determining 'soft' and 'hard' instruments

In this section, the proposed criteria, described in Chapter Three, will be used to determine three things: 1) the 'soft' or 'hard' instrumental makeup of Australian national initiatives for climate change policy over the period 1997-2007; 2) how thc Australian government distributed a number of instruments during this time; and 3) the trend use of such instruments over time. In terms of distinguishing between 'soft' and 'hard' instruments in climate policy, the thesis has developed the Determination of 'Soft' and 'Hard' Climate Instruments [DSHCI] approach comprising 17 criteria, which focus on the level of instrument dominance with key criteria to classify the 'soft' and 'hard' instrument designs of a national government in terms of reducing GHG emissions.

Table 5.2 (below) describes the specifications under the criteria of the DSHCI devised earlier in this thesis and employed here used for determining whether instruments are soft or hard, by examining the level of relative instrument dominance. Relative instrument dominance is determined by the level at which an instrument is dominated by the characteristics of hard instruments (also described in the Methodology: Chapter Three).

Table 5.2: Criteria for Determining 'Soft' and 'Hard' Instruments in Climate Policy

1. Information Provision (e g information support)
2. Educational Support by Government (e g technical support, training, and education)
3. Incentives and Subsidies by Government (e g government's financial supports)
4. Specific and Measurable Emission Reduction Targets in a program (e g. quantified and ideal is realistic)
5. Timeframe in a program (e g clear measurable timeline identified as short, medium and long term)
6. Guidance or Guidelines for implementation (e g details of implementation audited or licensed by government authorities)
7. Monitoring (e g activities are monitored or certified by government authorities)
8. Reporting and Certification (e g. periodically, annually and with quantitative reports on their actions Targets are reported or certified by government authorities)
9. Auditing, Reviewing and Certification (e g reports are audited, reviewed or certified by government authorities)
10. Public Disclosure (e g public recognition mandatorily required by governments)
11. Committed Contractual Improvement (e g mandatorily committed to by government)
12. Any Market Device or creation of competitiveness (e g emission trading, tax systems, green certificates)
13. Government Regulation for Standards (e g. building codes or energy performance standards)
14. Government Penalty of Polluter Pays (e.g legally required)
15. Government Penalty for Nonparticipation (e g same as above)
16. Government Penalty for Noncompliance (e g same as above)
17. Government Penalty for Failure to Meet Targets (e g same as above)

<u>Level of Instrument Dominance</u>
- 0,1-4 Least Dominant (Soft)
- 5-9 Moderately Dominant
- 10-13 Highly Dominant
- 14-17 Most Dominant (Hard)

There are four levels established in the criteria, used for determining whether instruments are soft or hard, and these are: least dominant, moderately dominant, highly dominant and most dominant. Least dominant refers to the softest instruments, whereas most dominant refers to the hardest instruments. The relative levels, moderately dominant and highly dominant, divide these two extremes. Instruments are categorised within this four level scheme in accordance with their makeup in terms of the 17 key elements in the criteria above (Table 5.2).

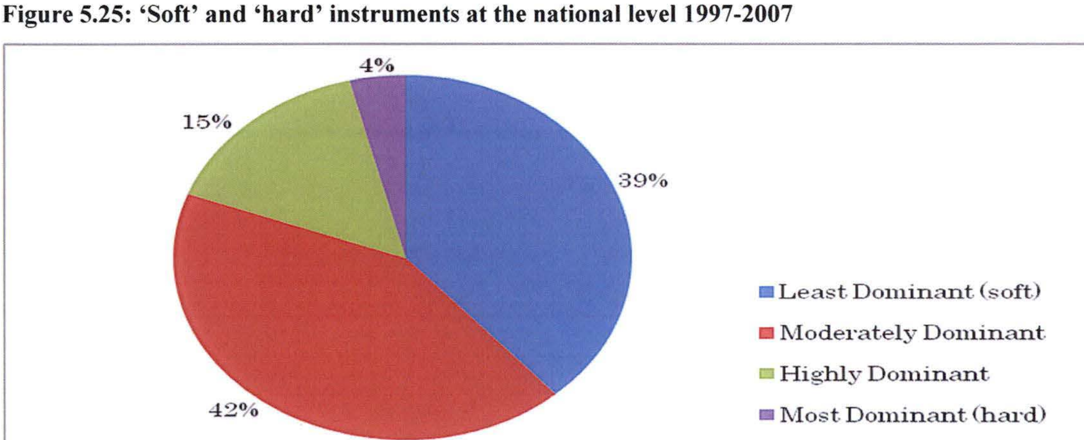
The following sections examine 'soft' and 'hard' instruments and their trends in Australia during the period 1997-2007 by using DSHCI approach. The data collection used for applying the DSHCI approach is based on national communication reports from 2002 and 2005 by the Australian Government to the UN. Additional data was obtained by interviews with several bureaucrats in relevant areas of the federal government. These meetings provided useful advice and material, such as additional measures not included in the communication reports up to 2007, to supplement the data collection. Each instrument used during the period was carefully examined by addressing the 17 criteria under the method. This analysis is very important to reveal how the Australian government allocated the level of instrumental coerciveness between 1997 and 2007 in order to reduce GHG emissions. This is the first time that such an examination has been used for identifying the levels of instrumental coerciveness.

5.2.2 'Soft' and 'Hard' Instruments at the National Level 1997-2007

5.2.2.1 'Soft' and 'hard' instruments at the national level

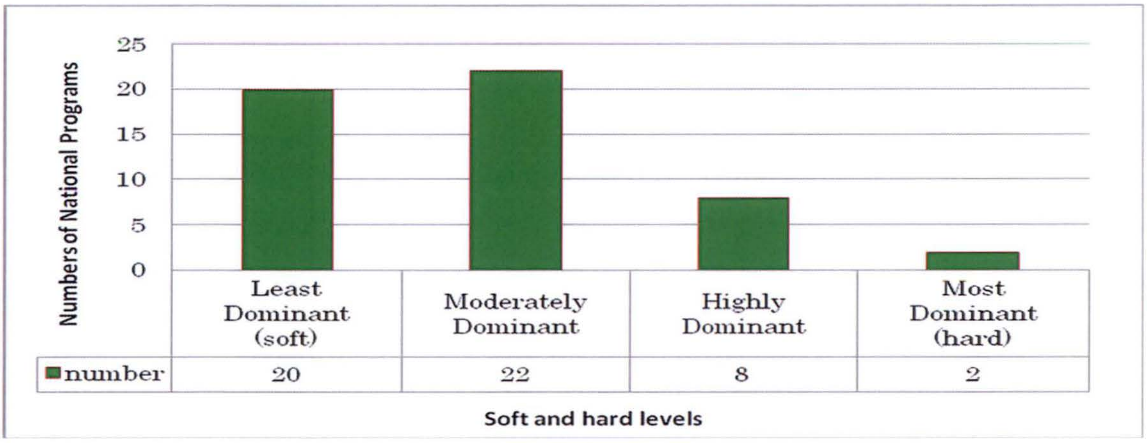
Figure 5.25 shows that there is therefore a heavy contrast between the usage of softer-based instruments (i.e. least and moderately dominant) and hard-based instruments (i.e. highly and most dominant). Results of the use of 'soft' and 'hard' instruments under national initiatives over the period 1997-2007 are presented in Figure 5.25. Moderately dominant instruments were the most common at 42%, followed by least dominant level at 39%. Only 2 out of 52 programs were found to be most dominant, which is only one eleventh the number of programs at the moderately dominant level, and one tenth the number at least dominant. In addition, nearly 80% of the total initiatives were found to be at either the least or moderately dominant level. The contrast between least and moderately dominant and highly and most dominant can be explained by considering much softer-based instruments (less dominant) used at the national level during the period. See Figure 5.26, which also illustrates the national instruments by number. Figure 5.25 clearly demonstrates that roughly 80% of instruments can be classed as softer instruments.

Figure 5.25: 'Soft' and 'hard' instruments at the national level 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.26: 'Soft' and 'hard' instruments at the national level 1997-2007, by number.

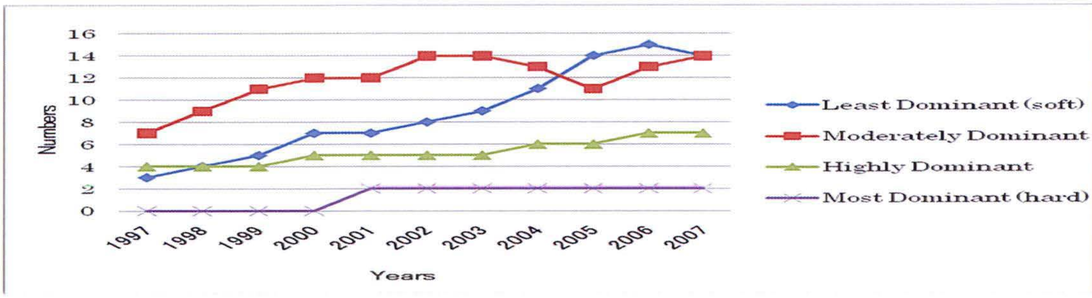


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.2.2 Trend uses in 'soft' and 'hard' instruments at the national level 1997-2007

Figure 5.27 presents the trend uses of 'soft' and 'hard' instruments at the national level over the period 1997-2007. Although programs at the highly dominant and most dominant levels during the period showed a tendency to increase gradually, programs at least dominant levels showed a significant program increase over time. As mentioned in Figures 5.25 and 5.26, moderately dominant initiatives were the most used over time. However, in Figure 5.27, the tendency of adopting the programs at moderately dominant fluctuated significantly over time, while increasing gradually. Moreover, as can be seen in the graph, (Figure 5.27), programs at least dominant levels increased dramatically in the second half of the decade, especially in 2004, and programs at highly and most dominant increased slightly over time. The results suggest that the tendency of program uses at the national level over the period 1997-2007 again demonstrates softer-based instrument uses, while increasing the number of total programs at any level.

Figure 5.27: Trend uses of 'soft' and 'hard' instruments, at the national level, 1997-2007



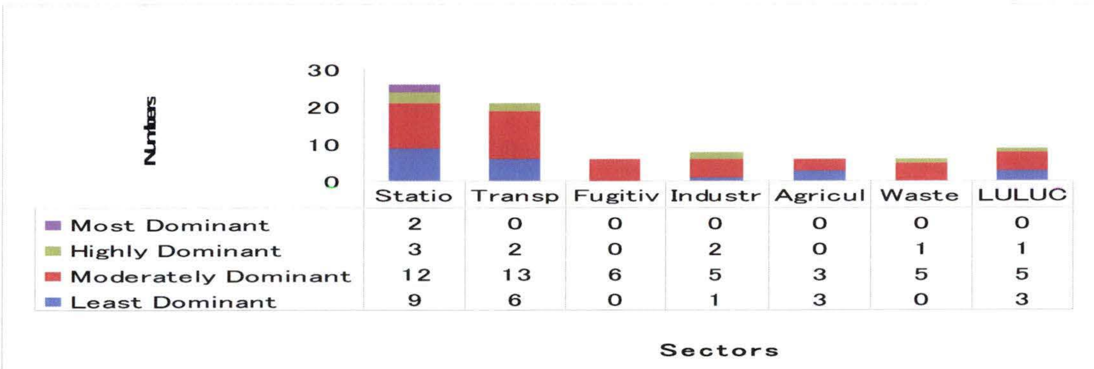
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3 'Soft' and 'Hard' Instruments at the Sectoral Level 1997-2007

5.2.3.1 'Soft' and 'hard' instruments at the sectoral level 1997-2007

Figures 5.28 and 5.29 illustrate 'soft' and 'hard' instruments at the sectoral level over the period 1997-2007. Firstly, Figure 5.28 presents the total numbers for each sector. As can be seen in the figure, most of the sectors utilised programs based on least, moderately and highly dominant levels, except the energy-stationary. However, although the energy-stationary sector introduced a few programs using instruments at the highly and most dominant levels, nearly three quarters of the programs used much softer-based instruments (less dominant). In addition, only programs in the energy-fugitive and agriculture sectors introduced initiatives at the least and moderately dominant levels. Figure 5.29 also displays the use of 'soft' and 'hard' instruments for the sectoral level over time with the percentage of the sectoral allocation, which reveals exact distribution of the use of instruments in each sector.

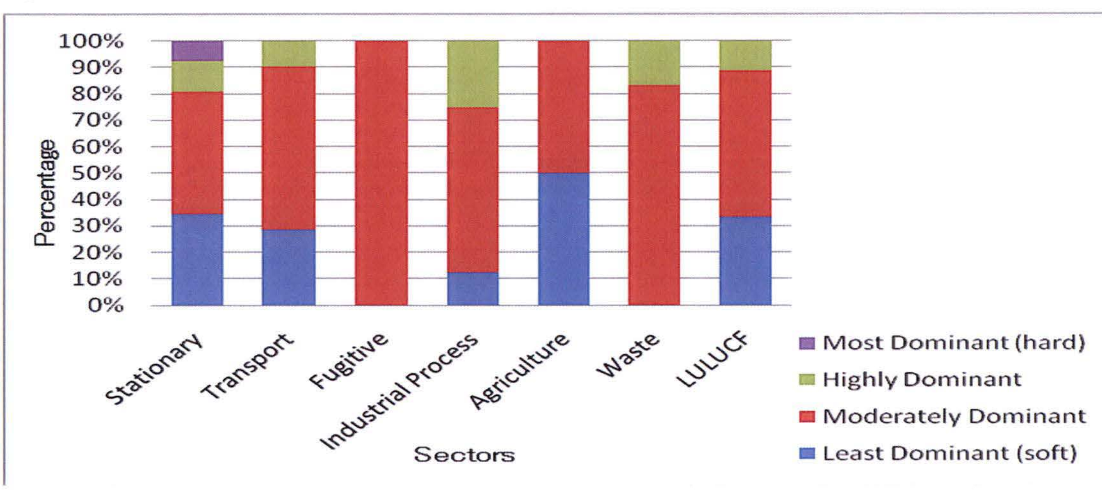
Figure 5.28: 'Soft' and 'hard' instrument uses at the sectoral level 1997-2007 by number



	Statio	Transp	Fugitiv	Industr	Agricul	Waste	LULUC
Most Dominant	2	0	0	0	0	0	0
Highly Dominant	3	2	0	2	0	1	1
Moderately Dominant	12	13	6	5	3	5	5
Least Dominant	9	6	0	1	3	0	3

Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.29: 'Soft' and 'hard' instrument uses at the sectoral level 1997-2007 by percentage

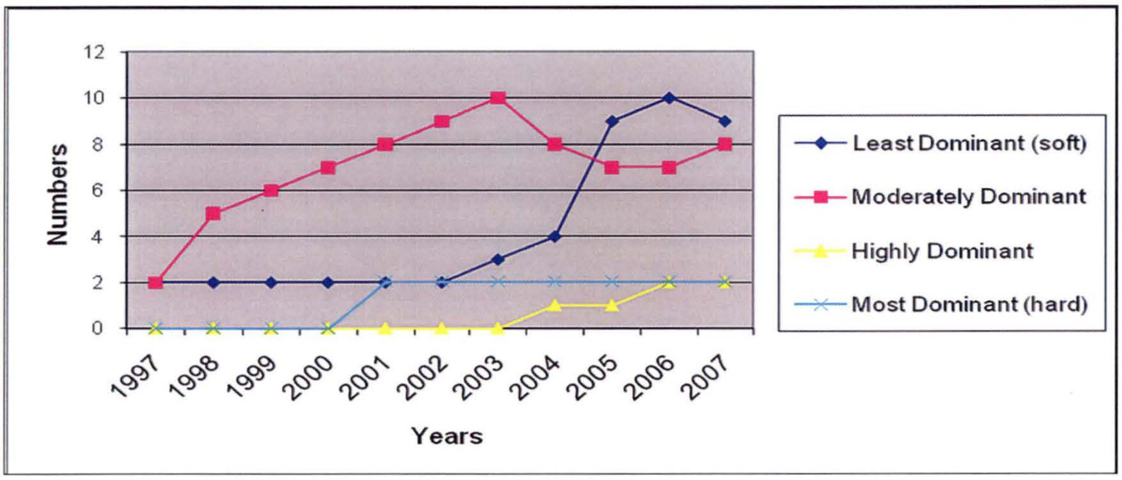


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3.2 Trend uses of 'soft' and 'hard' instruments in the Stationary-Energy Sector 1997-2007

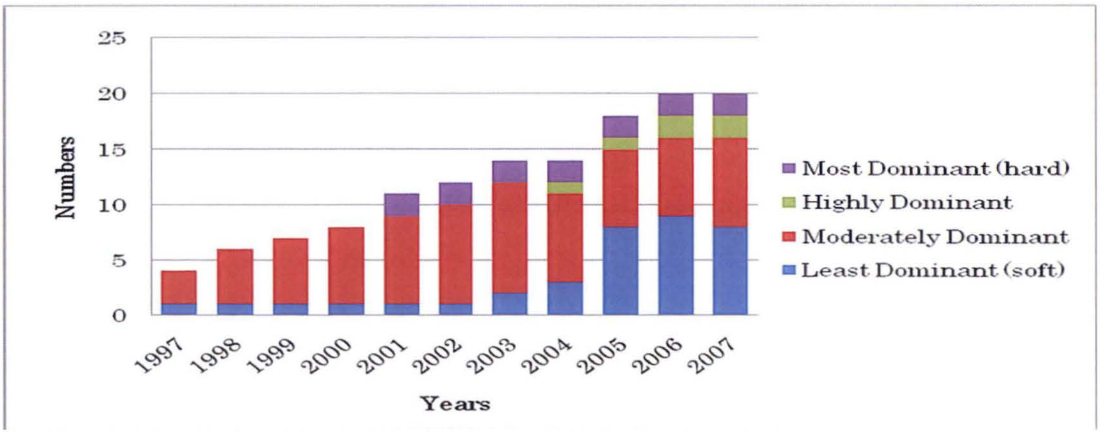
Details of the trend uses of 'soft' and 'hard' instruments in the stationary-energy sector over the period 1997-2007 by number are presented in Figures 5.30 and 5.31. While most of the programs in the sector were based on least and moderately dominant levels during the period, the number of programs at least dominant showed a tendency to increase dramatically, especially in 2005. At the same time, programs at moderately dominant tended to increase in the second half of the decade but declined significantly after. The programs at highly and most dominant levels tended to increase slightly, but still remained at lower levels than less dominant (the much softer instruments): least and moderately dominant levels over time. See Figure 5.32 which also illustrates the instrument trends by percentage during the period.

Figure 5.30: Trend uses of 'soft' and 'hard' instruments in the stationary-energy sector 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

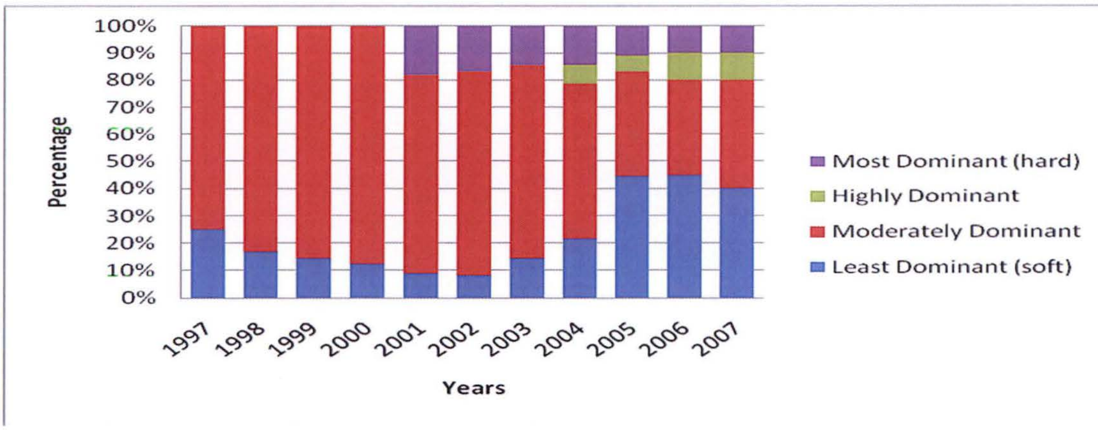
Figure 5.31: Trend uses of 'soft' and 'hard' instruments in stationary-energy 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National*

Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.32: Trend uses of 'soft' and 'hard' instruments in stationary-energy 1997-2007 by percentage

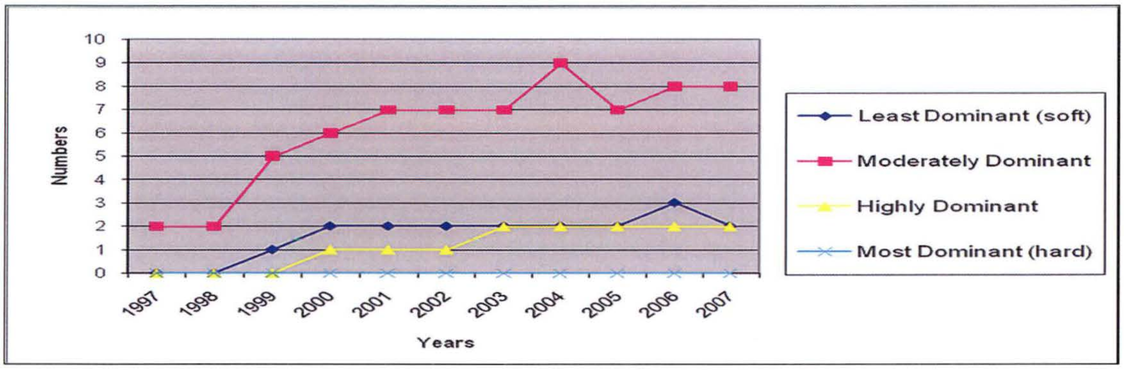


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3.3 Trend uses of 'soft' and 'hard' instruments in Transport-energy 1997-2007

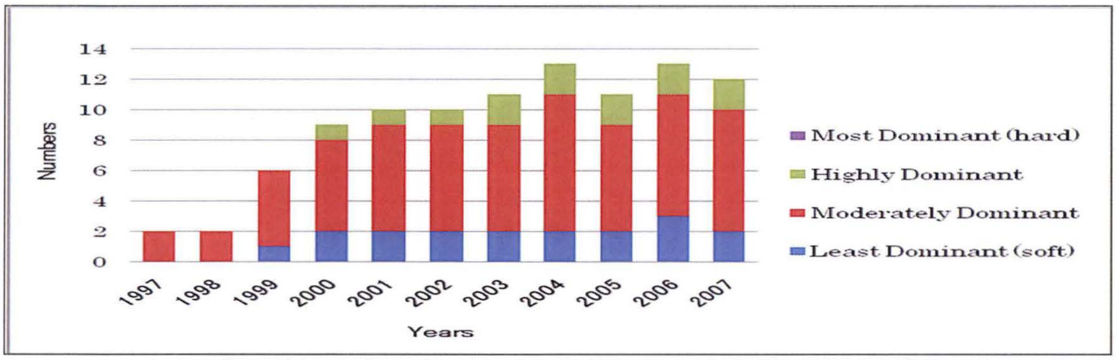
Figure 5.33 and 5.34 illustrate the trend of 'soft' and 'hard' instruments in the transport-energy sector over the period 1997-2007 by instrument numbers. The largest number of initiatives in the sector was at the moderately dominant level, which showed the highest predominance in this sector. There was no initiative most dominant over this time. In addition, the initiatives at both least and highly dominant showed a tendency to increase gradually during the period. These results may be explained by considering softer instrument uses in the transport-energy sector over time. See Figure 5.35 also shows the instrument trends during the period by percentage.

Figure 5.33: Trend uses of 'soft' and 'hard' instruments in transport-energy, 1997-2007



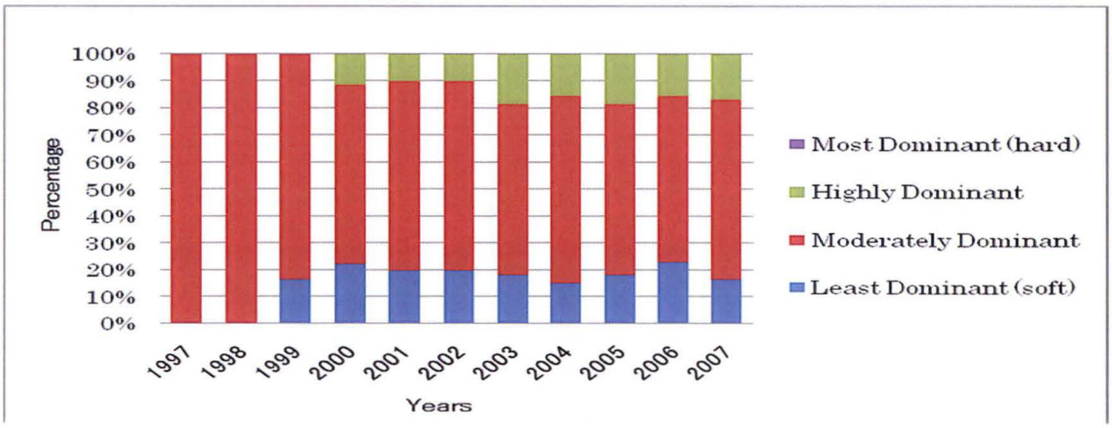
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.34: Trend uses of 'soft' and 'hard' instruments in transport-energy,1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.35: Trend uses of 'soft' and 'hard' instruments in transport-energy, 1997-2007 by percentage

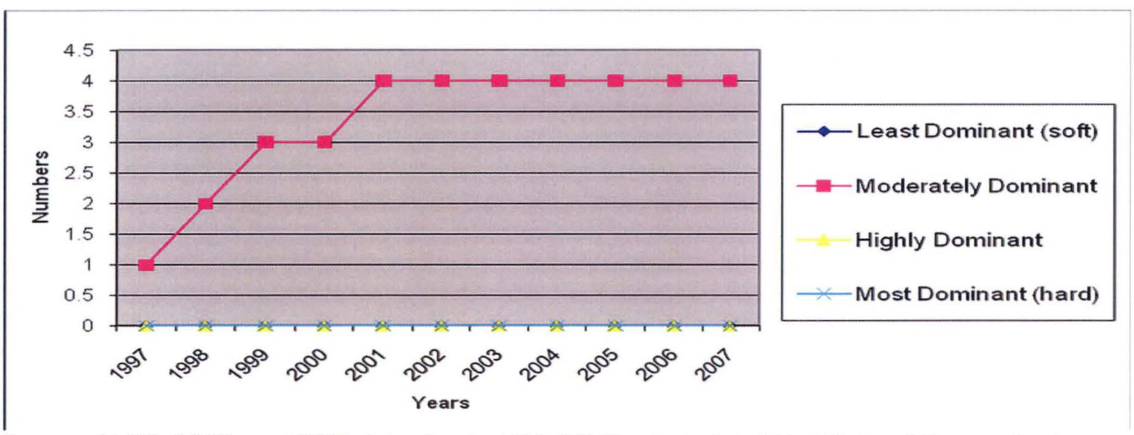


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3.4 Trend uses of 'soft' and 'hard' instruments in Fugitive-energy 1997-2007

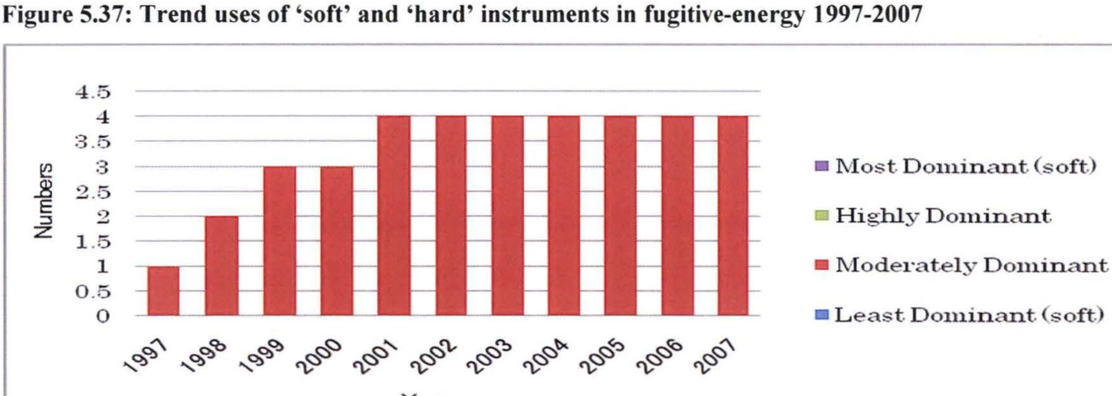
Details of the trend uses of 'soft' and 'hard' instruments in fugitive-energy over the period 1997-2007 are illustrated in Figures 5.36 and 5.37. Initiatives in this sector were only based at the moderately dominant level. These initiatives showed a tendency to increase over time; however, additional initiatives were discontinued after 2001. This is consistent with previous findings suggesting that softer-based instruments predominated over time.

Figure 5.36: Trend uses of 'soft' and 'hard' instruments in fugitive-energy, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.37: Trend uses of 'soft' and 'hard' instruments in fugitive-energy 1997-2007

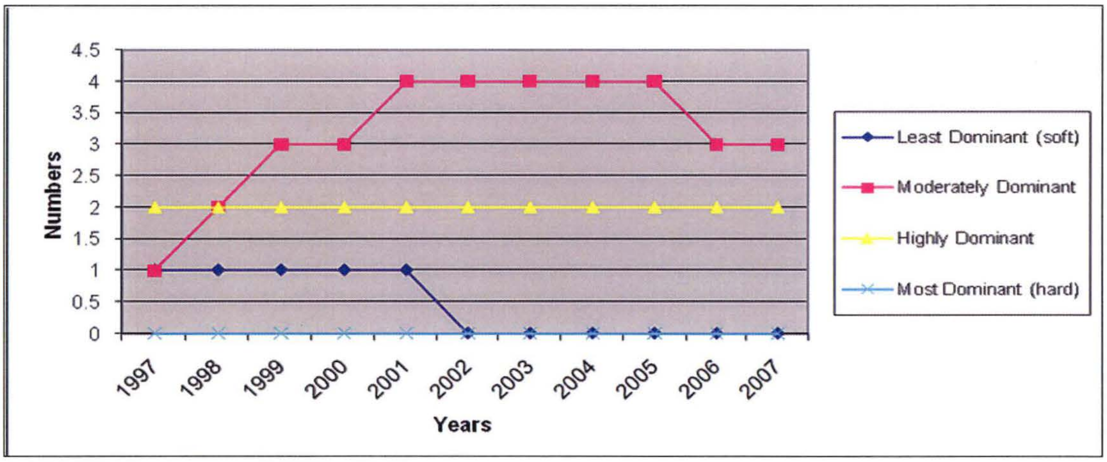


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3.5 Trend uses of 'soft' and 'hard' instruments in Industrial Processes 1997-2007

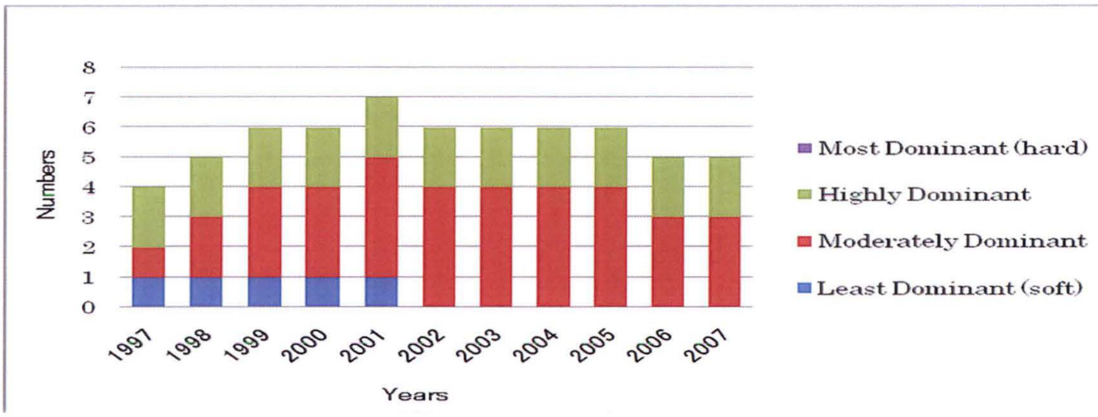
Figures 5.38 and 5.39 illustrate the trend uses of 'soft' and 'hard' instruments in industrial processes over the period 1997-2007 by instrument numbers. Moderately dominant initiatives dominated in the sector, followed by highly dominant initiatives. Initiatives that were at least dominant were introduced until 2001, with no further initiatives after that time. While initiatives at the highly dominant level remained at the same level during the period, initiatives at the moderately dominant level tended to increase in the first half of the period but then declined slightly. The results may be explained by considering that harder instruments were used over time compared to other sectors. See Figure 5.40 which also shows the instrument trends during the period by percentage.

Figure 5.38: Trend uses of 'soft' and 'hard' instruments, in industrial processes 1997-2007 by number



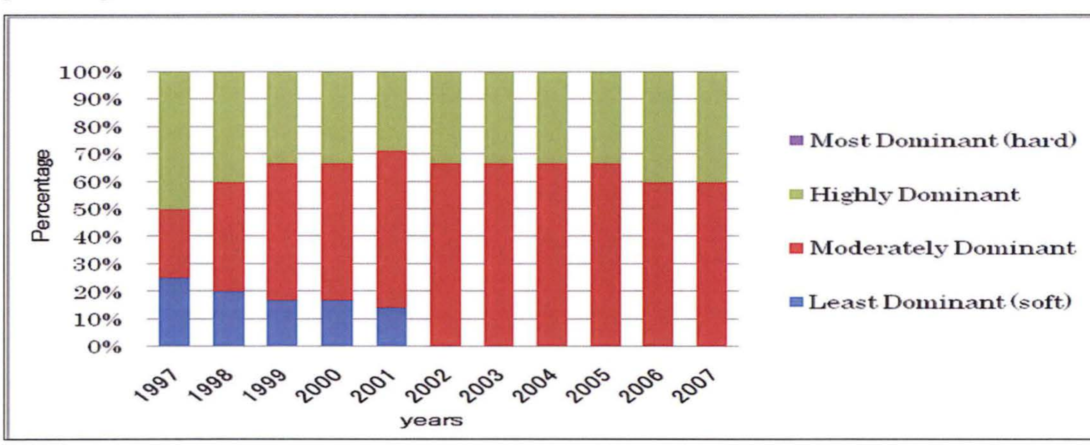
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.39: Trend uses of 'soft' and 'hard' instruments, in Industrial Process, 1997-2007, by number



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.40: Trend uses of 'soft' and 'hard' instruments, in Industrial Processes, 1997-2007, by percentage

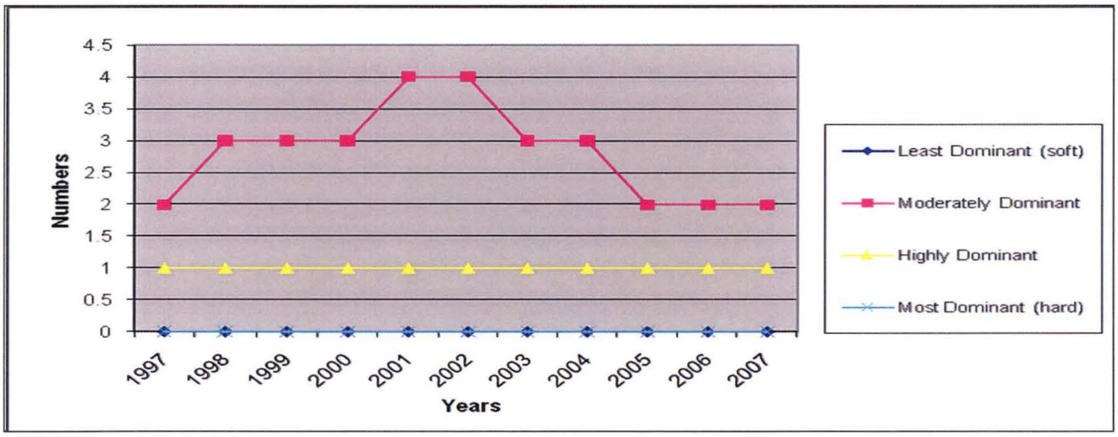


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3.6 Trend uses of 'soft' and 'hard' instruments in the Waste Sector 1997-2007

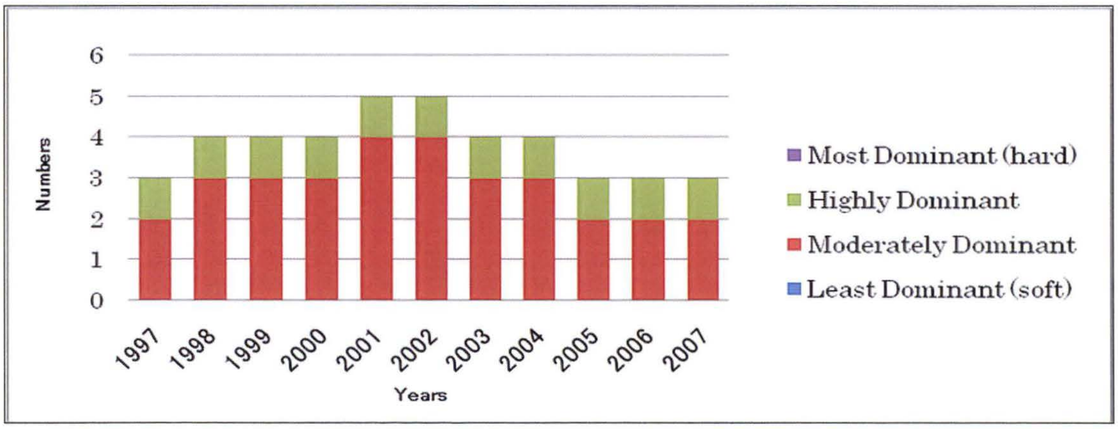
Details of the trend uses of 'soft' and 'hard' instruments in the waste sector over the period 1997-2007 are illustrated by instrument numbers in Figures 5.41 and 5.42. Only two levels of initiatives were used in the sector moderately and highly dominant. Initiatives at the moderately dominant level increased in the first half of the period but tended to decline since 2002. Initiatives at the highly dominant level remained at same level over time but with only one program. The results demonstrate that much softer instruments dominated the sector over time. See Figure 5.43 which also shows the instrument trends during the period by percentage.

Figure 5.41: Trend uses of 'soft' and 'hard' instruments, in the waste sector, 1997-2007



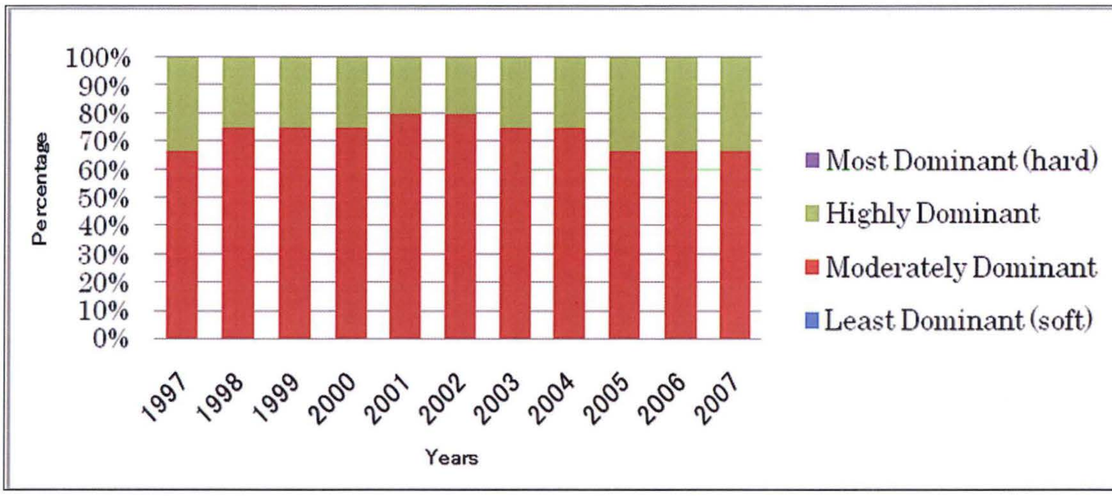
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.42: Trend uses of 'soft' and 'hard' instruments, in the waste sector, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.43: Trend uses of 'soft' and 'hard' instruments in the waste sector, 1997-2007 by percentage

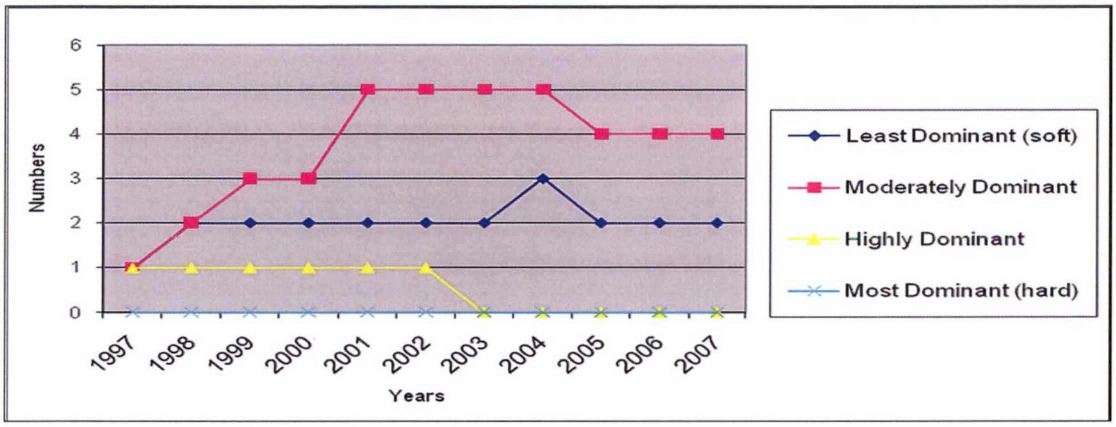


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3.7 Trend uses of 'soft' and 'hard' instruments in LULUCF 1997-2007

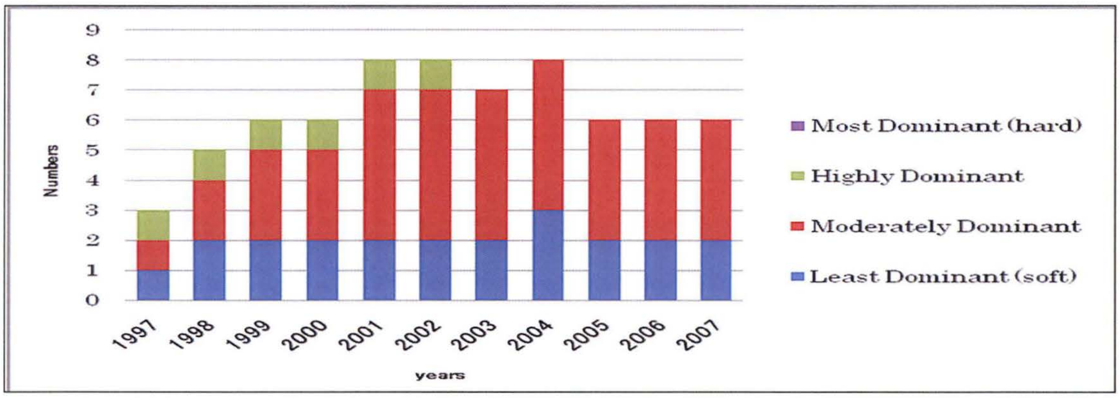
Figures 5.44 and 5.45 illustrate the trend uses of 'soft' and 'hard' instruments in LULUCF over the period 1997-2007. Initiatives based on moderately dominant level tended to increase in the first half of the period but declined after 2004. Initiatives at least dominant level remained stable until 2004 when there was a slight increase before a return to the previous level. These results showed that moderately dominant initiatives declined a little in 2004 before levelling out. An initiative at the highly dominant level was introduced but with no further implementation after 2002. See Figure 5.46 which also shows the instrument trends during the period by percentage.

Figure 5.44: Trend uses of 'soft' and 'hard' instruments, in the LULUCF, 1997-2007



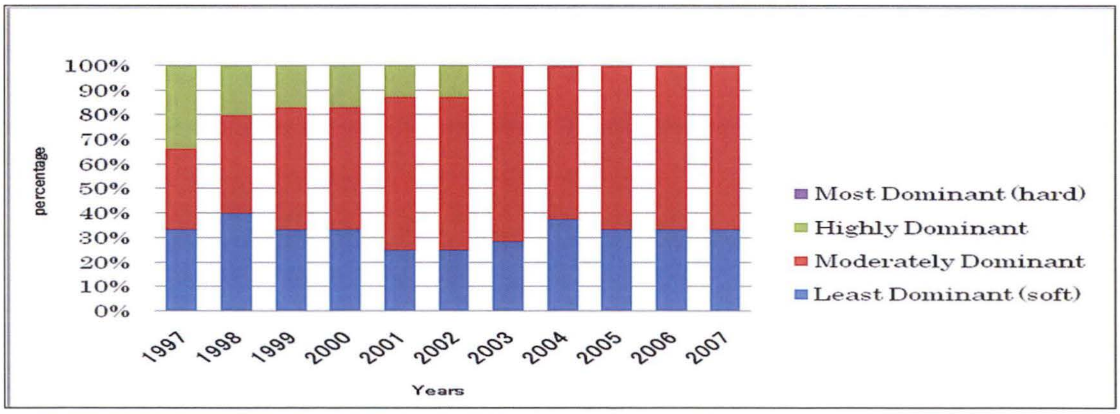
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.45: Trend uses of 'soft' and 'hard' instruments, in the LULUCF, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.46: Trend uses of 'soft' and 'hard' instruments, in the LULUCF, 1997-2007 by percentage



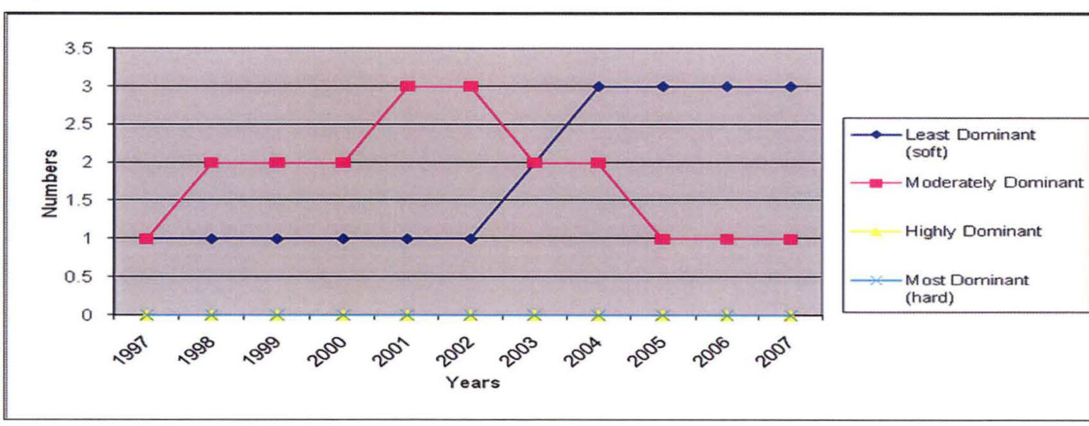
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian

Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.3.8 Trend uses of 'soft' and 'hard' instruments in the Agricultural Sector 1997-2007

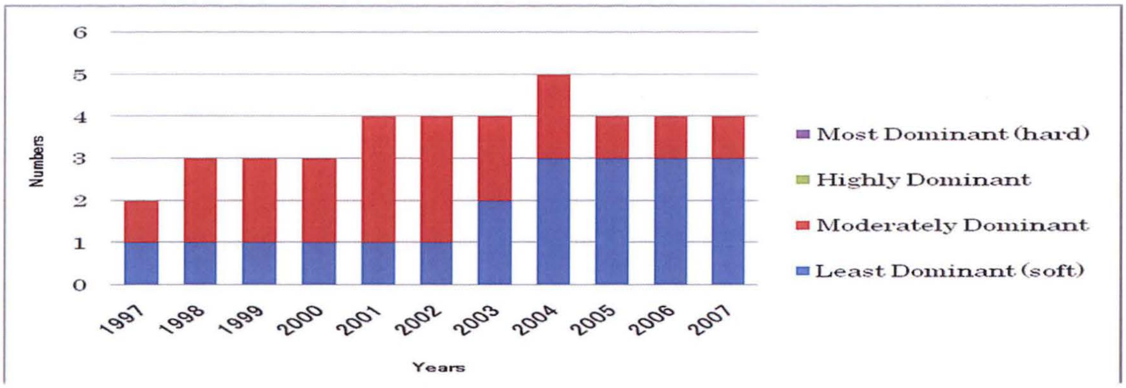
Details of the trend uses of 'soft' and 'hard' instruments in agriculture over the period 1997-2007 are illustrated in Figures 5.47 and 5.48. Only two types of instruments were used in this sector; least and moderately dominant initiatives. In the first half of the decade, initiatives at the moderately dominant level showed a tendency to increase, while initiatives at the least dominant level included only one program. However, in the second half of the period, initiatives under the least dominant level significantly increased after 2002, while initiatives at the moderately dominant level reduced significantly. The results demonstrate that the programs under the sector became much softer-based approaches over time. See Figure 5.49 which also shows the instrument trends during the period by percentage.

Figure 5.47: Trend uses of 'soft' and 'hard' instruments in agriculture, 1997-2007



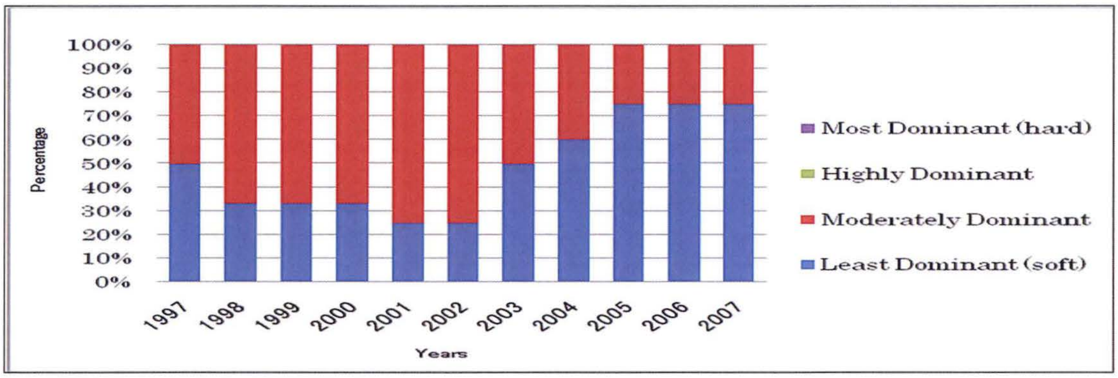
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.48: Trend uses of 'soft' and 'hard' instruments in agriculture, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

Figure 5.49: Trend uses of 'soft' and 'hard' instruments in agriculture, 1997-2007 by percentage



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

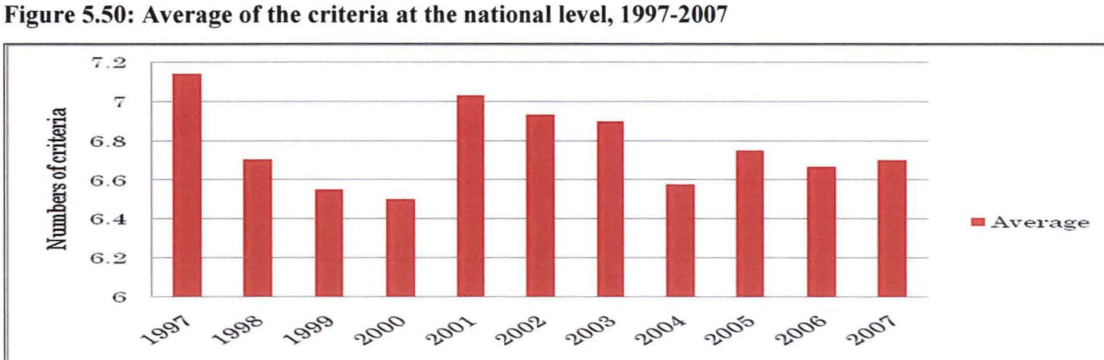
In terms of evaluating the distribution of 'soft' and 'hard' instruments under the national initiatives of climate change policy in Australia over the period 1997 to 2007, this section utilised two perspectives, namely to look at the national and at the sectoral level. This section also reviewed the overall picture and trend uses of 'soft' and 'hard' instruments, how information was reported by the national government. In a broad sense, it is likely that initiatives at the national level were generally based on softer-based instruments (less dominant), especially as indicated by least and moderately dominant over the time considered. Although, all the initiatives at any level tended to increase over time, these two softer levels highly dominated the total approaches. In specific terms, although these softer instruments at the least and moderately dominant levels remained at high levels in each sector over time, some sectors demonstrated fluctuations over time. For example, in terms of the agricultural sector, although the total initiatives were soft-based approaches, there was a significant shift to much softer based instruments towards 2007 than in the first half of the decade

5.2.4 Instrument Use at the National Level 1997-2007

5.2.4.1 Average number of key elements under the criteria at the national level, 1997-2007

Figure 5.50 presents the average number of the key elements under the criteria for the DSHCI approach, described in the Methodology (Chapter Three) in this thesis, which is used for determining the trend in 'soft' or 'hard' instruments over the period 1997-2007, using selected criteria consisting of 17 elements. This measurement scale allows for a simple and clear classification of the level of coercion between 'soft' and 'hard' instruments. Thus, it is important to measure the trend in use of the criteria and the average number, in terms of evaluating how a government designs the level of instrumental coercion for a certain period. The results show that the highest average number of the key elements under the criteria was found in 1997 and the lowest in 2000. As can be seen, all the average numbers of the key elements presented at around 6 to 7 out of 17, which means much softer instruments were used at the moderately dominant and most dominant levels. Although the tendency of the average numbers fluctuated over time, the tendency was to decline overall. This may be explained by considering the total average remaining low or one third of the total criteria, and also tending to be softer during the period.

Figure 5.50: Average of the criteria at the national level, 1997-2007



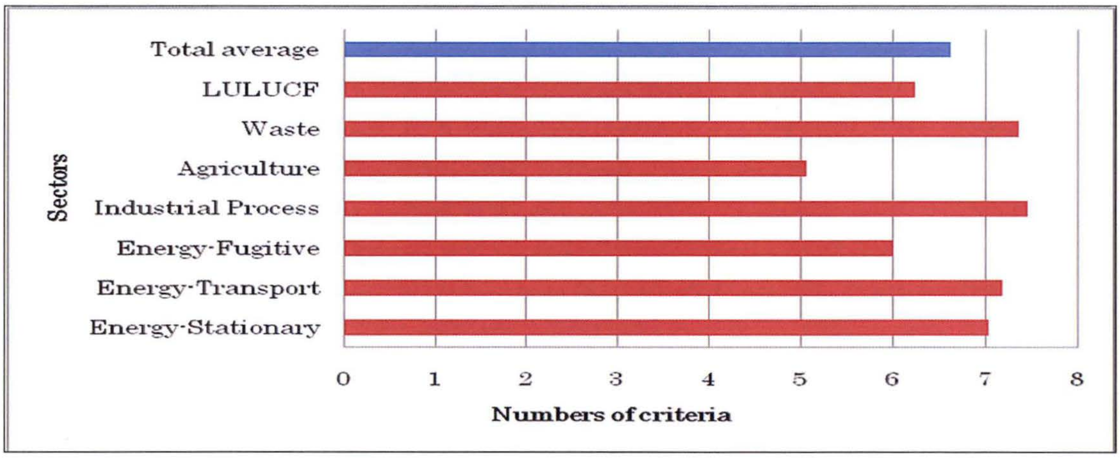
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National*

Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.4.2 Average number of key elements under the criteria at the sectoral level, 1997-2007

Figure 5.51 displays the average number of key elements under the criteria at the sectoral level over the period 1997-2007. The blue line indicates the average number of the total elements used in each sector. As revealed by the graph, the average shown under both the Agriculture and Industrial Process was higher than the total average. This can be explained by considering that these two sectors provided harder instruments than instruments used under other sectors. This shows the average number of the criteria at the national and sectoral levels above. It demonstrates how the country designed instruments during 1997-2007, and the preferences of the instrument uses in each sector. It is important to measure how a nation and each sector prefer differing relative dominances of their instrumental coerciveness over a certain period.

Figure 5.51: Average number of the criteria at the sectoral level 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

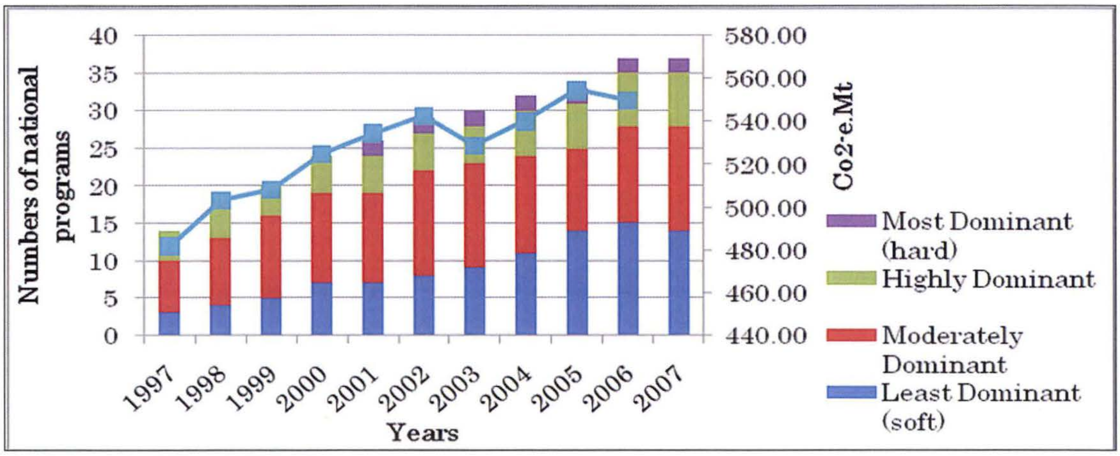
5.2.5 'Soft' and 'Hard' instruments & Emission Trends at the National Level

5.2.5.1 'Soft' and 'hard' instruments & emission trends (CO_2-equivalent) at the national level 1997-2007

This section examines the relationship between 'soft' and 'hard' instruments and emission trends at the national level during the period 1997-2007. Results in this section will, in particular, show how the 'soft' or 'hard' instruments used by government correspond with emission trends.

Figure 5.52 displays the comparison between the level of 'soft' and 'hard' instruments used and emission trends (CO_2-equivalent) at the national level over the period 1997-2007. As can be seen in this figure, emission trends in this country gradually increased over time, while the number of instrument uses also increased. In terms of the use of instruments, most of the instruments used during the period were either least or moderately dominant. and the instruments least dominant especially showed a tendency to increase significantly. These results indicate that the national government preferred softer instruments and gradually increased the usage of soft instruments over the period in question, while also experiencing a rapid growth in emissions.

Figure 5.52: Comparison between 'soft' and 'hard' instruments & emission trends at the national level 1997-2007



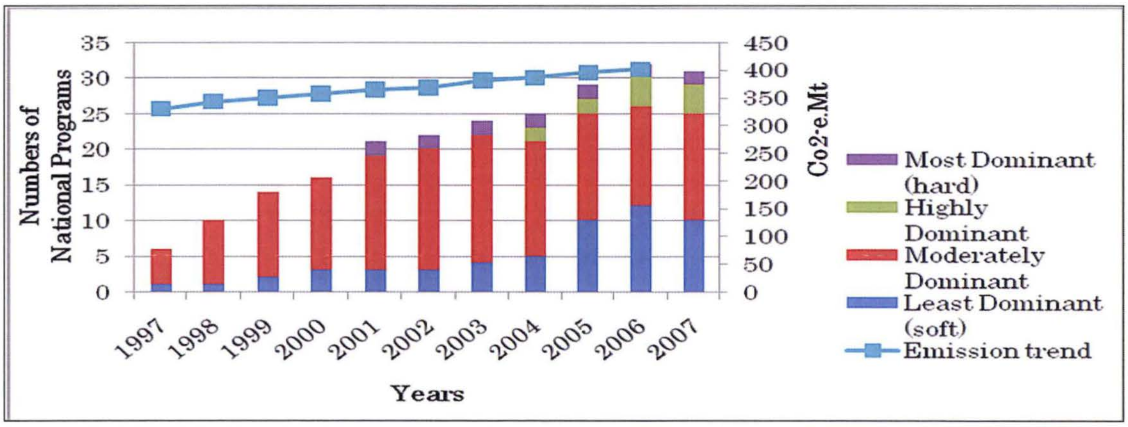
Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.6 'Soft' and 'Hard' instruments & Emission Trends at the Sectoral Level

5.2.6.1 'Soft' and 'Hard' instruments & Emission Trends (CO_2-equivalent) in the Energy Sector 1997-2007

Details of the comparison between 'soft' and 'hard' instruments and emission trends in the energy sector over the period 1997-2007 are presented in Figure 5.53. The trend of emission growth in the sector is a steady increase over time. In regard to instrument use, although instrument use at highly and most dominant levels was introduced by the government during the period, especially in the second half of the decade, instrument use was largely dependent on softer instruments: least and moderately dominant; and this also tended to increase over time. Especially, again, the sectors preferred softer instruments, and tended to increase to much softer instruments significantly over the period, while the greenhouse emissions increased.

Figure 5.53: Comparison between 'soft' and 'hard' instruments & emission trends in the energy sector, 1997-2007

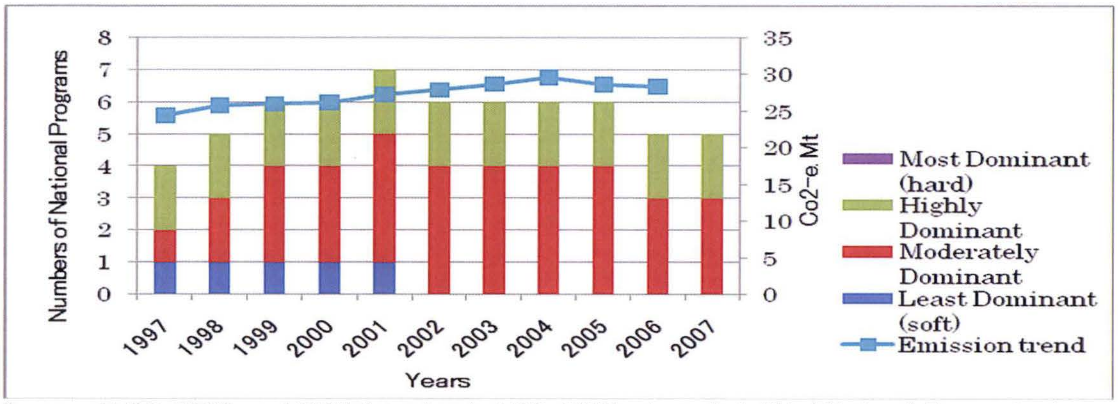


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.6.2 'Soft' and 'Hard' instruments & Emission Trends (CO_2-equivalent) in the Industrial Process Sector 1997-2007

Figure 5.54 shows the comparison between 'soft' and 'hard' instruments and emission trends in the Industrial Process sector over the period 1997-2007. As shown in the figure, emission trends increased slightly over time. In terms of instrument use, instruments at moderately and highly dominant levels dominated during the period in question. These results show that the industrial process sector used much harder instruments than other sectors did, while having a slower increase in their emissions growth.

Figure 5.54: Comparison between 'soft' and 'hard' instruments & emission trends in the industrial process sector, 1997-2007

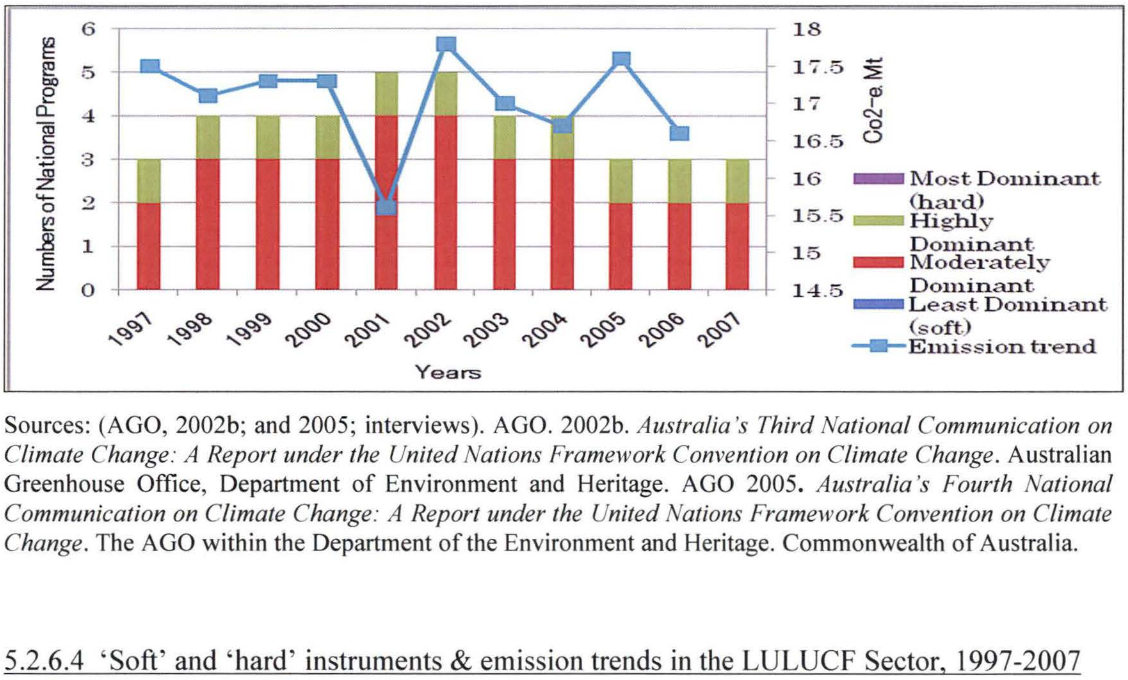


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.6.3 'Soft' and 'hard' instruments & emission trends (CO_2) in the Waste Sector, 1997-2007

Figure 5.55 reveals the comparison between 'soft' and 'hard' instruments and the emission trends in the waste sector over the period 1997-2007. Interestingly, the emission trends showed a significant increase in emission growth over time, although it showed some fluctuation. In terms of instrument uses, the number of instruments tended to decline during the period and were based on instruments at moderately and highly dominant levels, which are harder instruments than used in other sectors such as the energy sector.

Figure 5.55: Comparison between 'soft' and 'hard' instruments & emission trends in the waste sector, 1997-2007

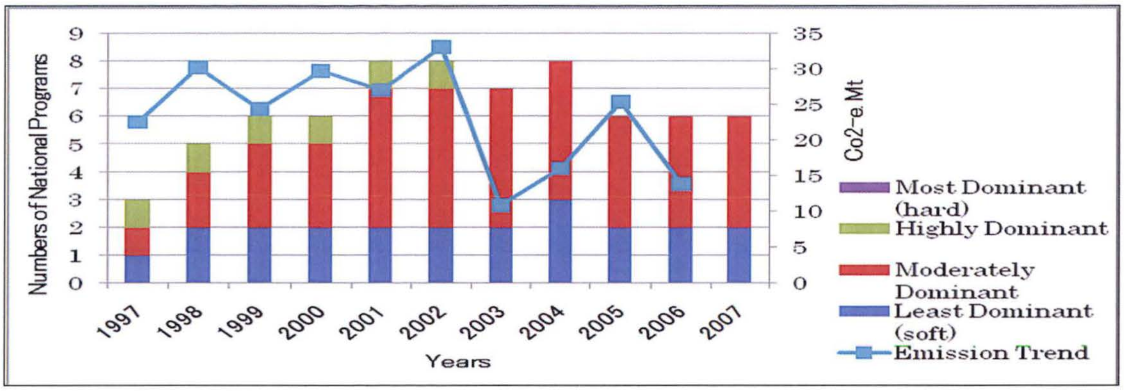


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.6.4 'Soft' and 'hard' instruments & emission trends in the LULUCF Sector, 1997-2007

Details of the comparison between 'soft' and 'hard' instruments and emission trends under LULUCF over the period 1997-2007 are shown in Figure 5.56. As revealed by the graph, emission trends showed a significant decrease over time. In terms of instrument use, although the number of instruments increased in the first half of the decade, it then decreased slightly. There was also a tendency towards softer instruments over time. These results indicate that the LULUCF sector used much softer instruments over the above period and tended to be much softer, while showing a dramatic decrease in emission growth.

Figure 5.56: Comparison between 'soft' and 'hard' instruments & emission trends in the LULUCF sector, 1997-2007

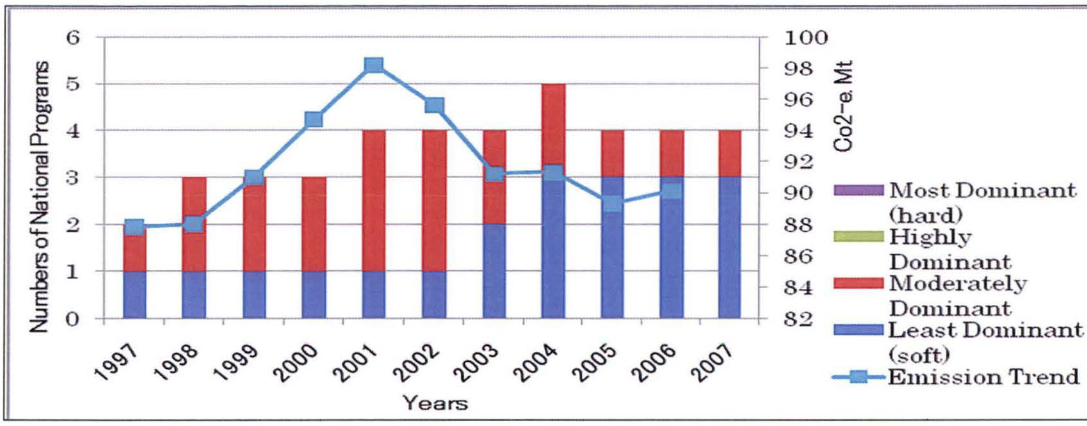


Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

5.2.6.5 'Soft' and 'hard' instruments & emission trends (CO_2-equivalent) in Agriculture, 1997-2007

Figure 5.57 reveals the comparison between 'soft' and 'hard' instruments and emission trends in the sector of agriculture over the period 1997-2007. As can be seen in the graph, emissions showed a slight overall increase by the end of the decade, although they had shown a significant increase over the first half of the decade. In terms of instruments used, the number of instruments increased over time, and these instruments were based on the much softer instruments: those least and moderately dominant. These results reveal that the agricultural sector used much softer instruments than any other sectors and tended to be much softer over time, while experiencing a slow increase in emission growth

Figure 5.57: Comparison between 'soft' and 'hard' instruments & emission trends in agriculture, 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

This section examined the relationships between 'soft' and 'hard' instruments and emission trends at the national and sectoral levels. These results are critical to understanding which instruments the government preferred during a particular period, and the impact upon its national emission trends.

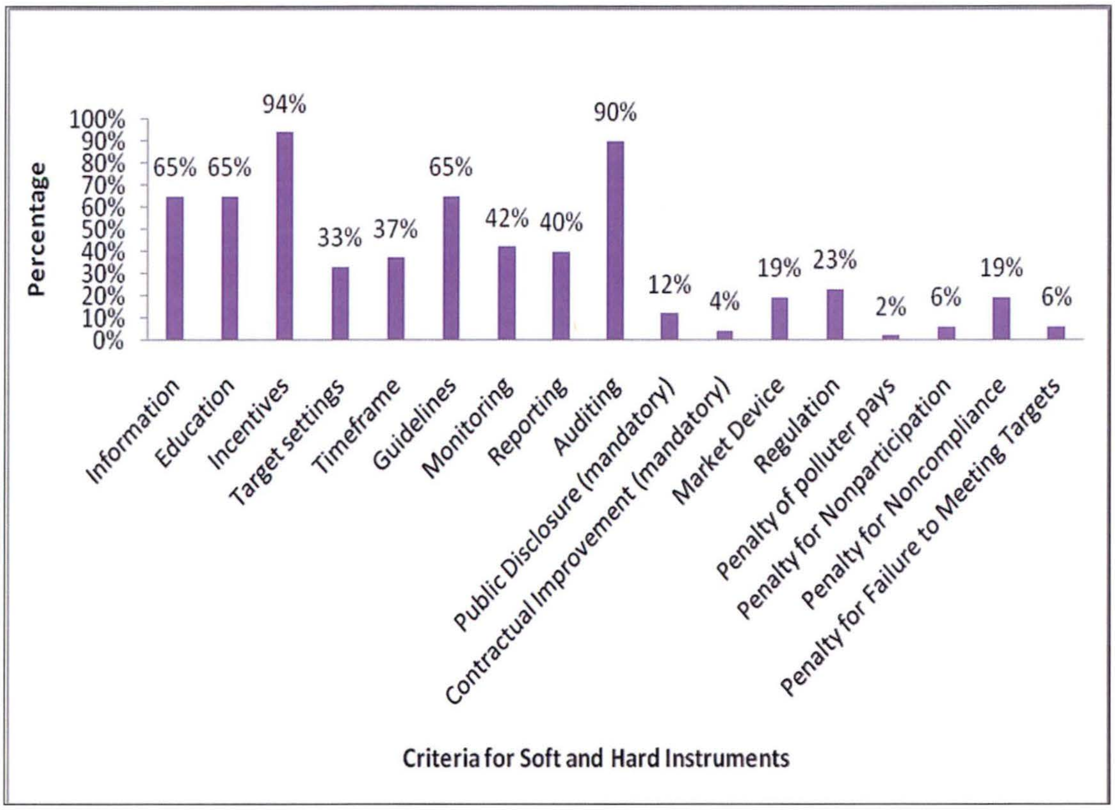
The following section examines what the government preferred most and which were its most avoided instruments over the period by analysing each specified element under the criteria in the DSHCI approach, used for determining 'soft' and 'hard' instruments.

5.2.7 Elements under the Criteria in DSHCI at the National Level 1997-2007

5.2.7.1 Percentage of each element under DSHCI criteria at the national level 1997-2007

Figure 5.58 describes the percentage of each element under the criteria in the DSHCI approach at the national level 1997-2007 in order to examine what instruments the government preferred most and which were most avoided. The highest rate of instrument usage was found to be incentives and grant uses at 92%, followed by auditing by government at 90%. By contrast, the lowest rate of instrument usage was found to be penalties for polluter pays at 2%, followed by committed contractual agreements at 4%. As mentioned, instrument uses under the national approaches during the period were strongly based on softer instruments rather than harder ones (see previous sections).

Figure 5.58: Percentage of each Element under Criteria the National Level 1997-2007



Sources: (AGO, 2002b; and 2005; interviews). AGO. 2002b. *Australia's Third National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. Australian Greenhouse Office, Department of Environment and Heritage. AGO 2005. *Australia's Fourth National Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. The AGO within the Department of the Environment and Heritage. Commonwealth of Australia.

As shown in Figure 5.58, these results can be explained by considering the number of the elements as recognised by the highest rate of instrument usage, that were dominant: grants (94%), auditing (90%), information provision (65%), education and training (65%), and incentives and guidance (65%). This indicates that these elements were the most preferred by the government. After these elements, the figure also showed other instrument use: i.e. monitoring by government (42%), reporting by government (40%), specific timeframe setting (37%), and specific target settings (33%) which can be described as less preferred elements under the national approaches. Lastly, the rest of the elements include: regulation and standards (23%), market devices (19%), penalties for noncompliance (19%), public disclosure (12%), penalties for non-participation and not-meeting targets (6%), committed contractual agreement (4%) and penalties for polluter pays (2%) which may be explained as the most avoided elements within the national approaches over time. These results reveal that the government had preferred approaches in terms of reducing greenhouse gas emissions at the national level. Relatively preferred approaches by the government were shown to be more incentive based, information-based instruments and taking a position of responsibility for all the activities rather than imposing strict governmental interventions such as monitoring and interventionist actions by government. Moreover, these results also indicate that the government avoided instruments in which the public sector imposes penalties, public disclosures and competition during the period.

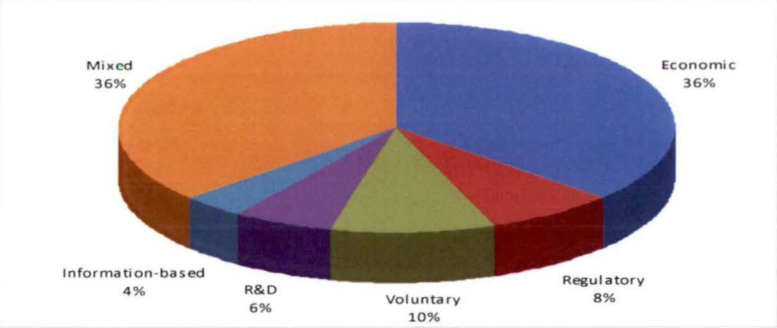
5.3 Discussion

The objectives of this section are to discuss the findings obtained under the DSHCI approach used for determining whether instruments are 'soft' or 'hard'. This study also specifically evaluated instrument use under Australian national climate change policy over the period 1997-2007. Building on the results in the previous sections, this chapter will next analyse and classify the findings into the three major objectives of this study, including: how the method, described in Chapter Three applies in each case study; how the Australian government categorised a number of instruments during the period; and what the trend uses were over time. Firstly, this discussion will demonstrate the major findings of this chapter in terms of instrument categories and the proposed method used for determining the level of relative dominance; and whether an instrument is 'soft' or 'hard'. Secondly, this section will reflect on why the results obtained under the method are important for the field of public policy. Thirdly, this section will further discuss alternative explanations of the results obtained. Finally, it will conclude with an overview of the application of the method and the circumstances surrounding 'soft' and hard' instrument uses under Australia's climate change policy initiatives at the national level over the period 1997-2007.

5.3.1 Major Findings of the Study

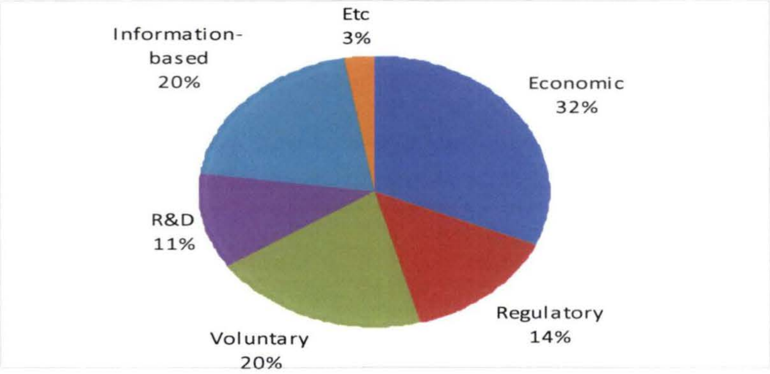
5.3.1.1 Findings - Instrument categories

5.3.1.1.1 Tendency to introduce mixed instruments



Firstly, in terms of sorting instrument uses into instrument categories, the results identified that a large number of instruments utilised under the national approaches over the period 1997 to 2007 were mixed instruments, at 36% of the total (refer Figure 5.1, p.135, reproduced here), Mixed instruments can include programs such as the Greenhouse Friendly Program (2001-2004,) which contains both information-based and economic instruments. Furthermore, in terms of the trend use of mixed instruments, the results also demonstrate that nearly 35-40%, or over one third, of the total initiatives remained in effect over the above timeframe. These results can be explained by considering how the government preferred to increase the use of mixed instruments in programs during the period.

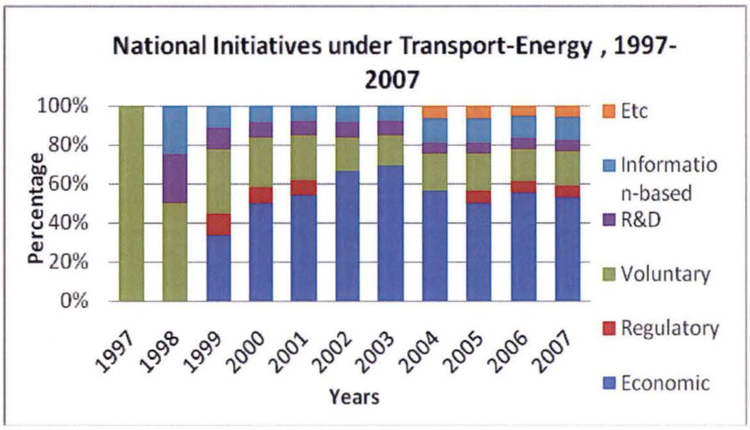
5.3.1.1.2 High dominance of economic and voluntary instrument approaches

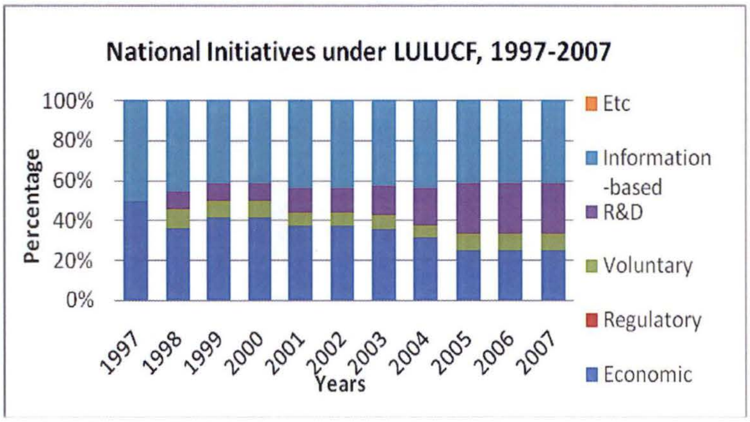


Secondly, the results sorted by instrument categories also show a high dominance of economic, information-based and voluntary instruments introduced by the government over the period 1997-2007 (refer Figure 5.3, p.136, reproduced here). Overall, the results identified the use of economic instruments at 33%, followed by voluntary instruments at 21%. Although the rate of information-based instruments was shown to be at 16%, regulatory instruments at 16% and R&D at 12%, the tendency of instrument use in each sector was to depend highly on the economic and voluntary instruments. These results suggest that the government focused on more economic and voluntary based approaches rather than others such as regulatory instruments.

5.3.1.1.3 Variety of instrument use in different sectors

Thirdly, the results also demonstrated that significant trends occurred with a variety of instrument uses in each sector over the period. Some sectors introduced more economic instruments, and some utilised regulatory instruments or information-based instruments. For instance: the waste sector introduced regulatory instruments with an average of nearly 30% over time rather than economic instruments at just above 10%. On the other hand, the energy sectors introduced relatively more economic instruments, especially the transport-energy sector which showed that over 50% of the instruments were based on economic instruments, especially in the second half of the decade (refer Figure 5.14, p.143 reproduced here). Moreover, LULUCF maintained nearly 40% of its instruments as information-based. Interestingly, in the LULUCF sector, the use of R&D instruments became increasingly popular over time, while showing a parallel





significant tendency to decrease the use of economic instruments (refer Figure 5.21, p.147 reproduced here). In spite of all the initiatives being under the same government, these results demonstrate that each sector has a different preference of instrument uses.

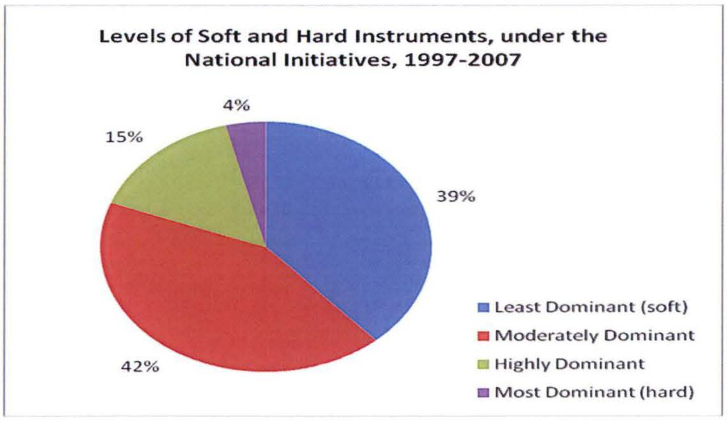
.3.1.1.4 Understanding the level of relative dominances among different instruments

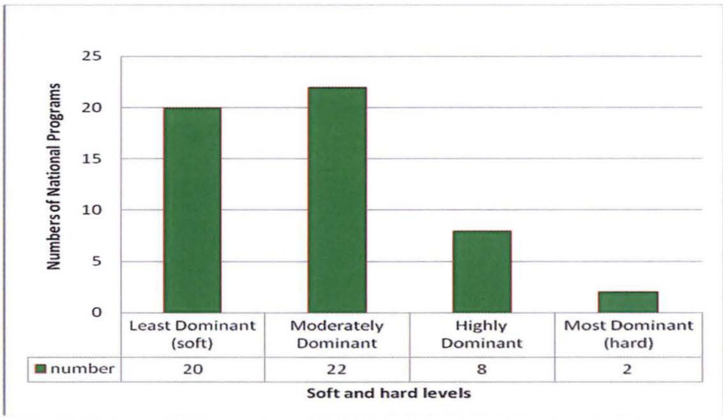
Lastly, having identified a range of findings in the results, the instrument categories still present some difficulties when attempting to identify the level of relative dominances among different instruments. An instrument's relative dominance represents how much that instrument is dominated by the characteristics of hard instruments in terms of reducing GHG emissions. Although results sorted by the instrument categorisation may be a useful tool in the broad sense of understanding of which instruments are used by national government, this categorisation still seems to be incapable of demonstrating the level of relative dominances between 'soft' and 'hard' instruments. As mentioned, this thesis proposed and applied a method to determine whether instruments are 'soft' or 'hard' in the case studies. The following sections will present the major findings obtained by this method, especially focusing on identifying the level of relative dominance under the national approaches.

5.3.1.2 Criteria #1: The method used for determining whether an instrument is 'soft' or 'hard'

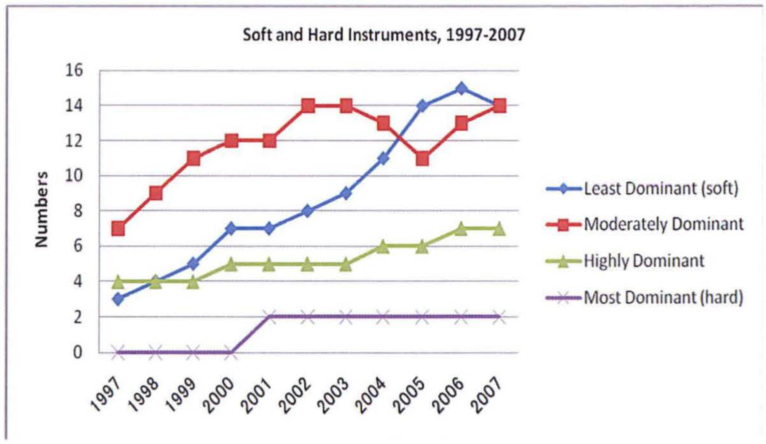
5.3.1.2.1 Soft-based instrument approaches by the government

Firstly, the method used for determining whether instruments were 'soft' or 'hard' instruments under the national approaches over the period 1997-2007, reveals a clear identity of the most dominant use of instrument. These figures from the results show the exact level of national instrument use during the period (refer: Figure 5.25, p.151; and Figure 5.26, p.152; reproduced here). Least dominant represents the softest level and most dominant the hardest level. This result clearly demonstrates that the majority or nearly 80% of the total national initiatives for climate change policy during the period were based on softer instruments at least and moderately dominant. These results confirm that the government focused more on soft based (less dominant) instrument approaches over time.

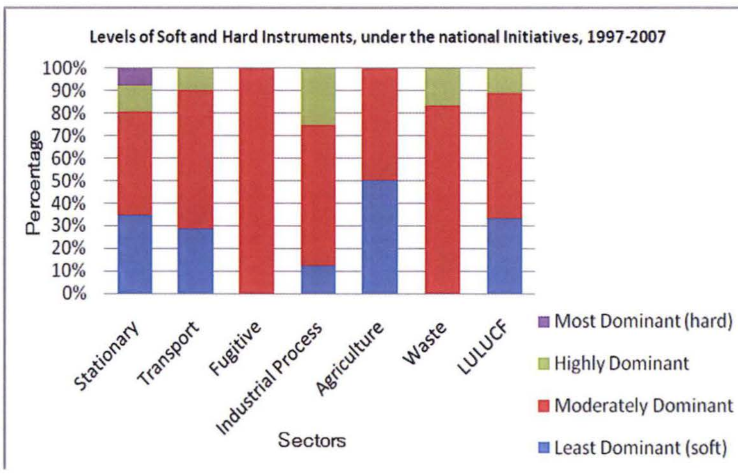




5.3.1.2.2 Tendency to use much softer instruments over time

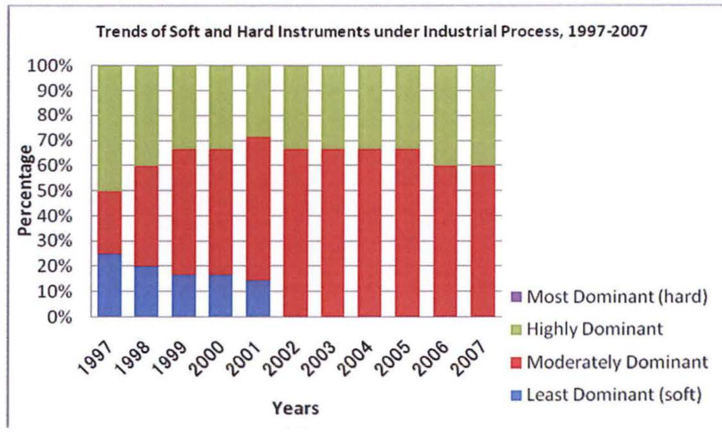


Secondly, the results obtained here clearly exhibit the trends of the class of instrument coerciveness, under the national policy over the period 1997-2007. They reveal that there is a trend for the government to rely on softer based instruments over time; as mentioned in the previous findings, the figures on the right show instruments at a softer level such as least and moderately dominant level, were strongly preferred over time under the approaches (refer Figure 5.27, p.153, reproduced here). The results also reveal that although harder instruments, such as highly and most dominant initiatives increased slightly, the softer instruments at highly and most dominant levels dramatically increased at the same time, especially in terms of the percentage of level one instruments as shown in figures with a significant growth in the second half of the period (refer Figure 5.29, p.154, reproduced here). These findings can be explained as the government tended to introduce increasingly softer instruments so that they remained highly dominant under the national policy over the period 1997 to 2007.

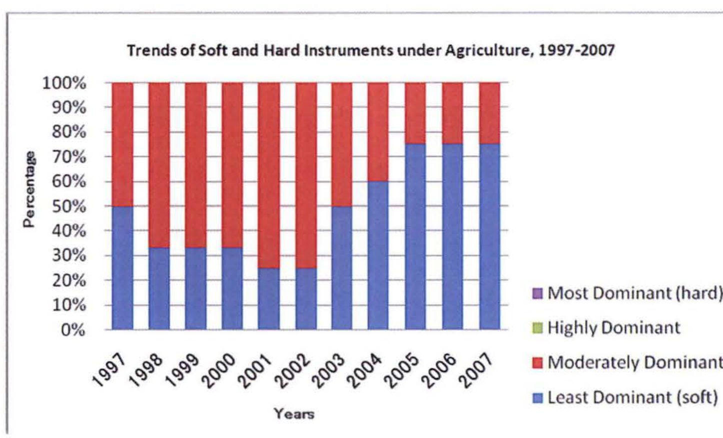


5.3.1.2.3 Different trends of the level of instrument uses in each sector

Lastly, the results also show a variety of instrument uses in each sector during the period. Although the initiatives in each sector remained the basis for using softer instruments over time, some sectors were more likely to introduce much harder instruments than others.

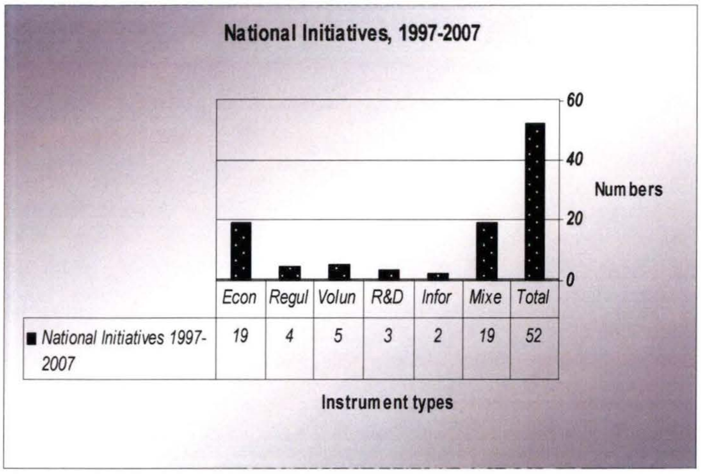


For example, the industrial process and waste sectors used a high percentage of instruments at highly dominant levels, at approximately 40%, and 20 -30% over time, although there were some fluctuations (refer Figure 5.39, p.159, reproduced here). On the contrary, some sectors ended up with a rate of softest instruments at the least dominant level in 2007 such as agriculture (over 70%), energy stationary (over 40%), and LULUCF (over 30%) (refer Figure 5.49, p.164, reproduced here). These results show that the government differentiated their approach in different sectors.

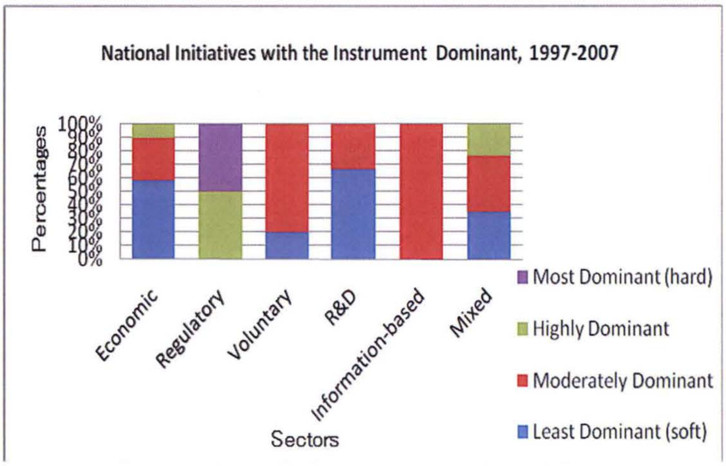


<u>5.3.1.3 Criteria #2: Comparison of the results for the Instrumental Categories and the Criteria used for 'Soft' and "Hard' instruments</u>

This study compared the results for the CCPIC and the DSHCI approaches used in this thesis for determining whether they are 'soft' or 'hard' instruments in order to demonstrate what could be said about the relative differences of the power relations between these two results. The figure on the left below contains the total numbers of instruments used in each policy over the period 1997-2007.



The figure on the right below shows, the percentage of instrument coercive level of each instrument during the period (refer Figure 5.2, p.135, reproduced here). As can be seen in the same figure, the percentage under the regulatory instruments showed the hardest instruments used (refer Figure 5.29, p.154, reproduced here). Economic instruments and R&D instruments were found to be much softer instruments than the other instruments over the period. These results can be explained by considering that regulatory instruments are relatively harder than other instruments. Moreover, voluntary and information-based instruments used under the policy, were relatively softer but not too soft. The use of economic[32] and R&D instruments by Australian government over the period can be explained by considering them as the softest instruments in the context.



[32] The use of economic instruments, during 1997-2007, was based on incentive-based instruments. Thus, the results could be differentiated if the market-based economic instruments (i.e. carbon tax and emission trading scheme [ETS]) were implemented.

5.3.2 Significance of the Findings

This section will discuss why the results obtained by criteria used for determining whether instruments are 'soft' or 'hard', are important. There are three major benefits of using such criteria in order to provide policy makers with a clear picture of instrument characteristics and their effectiveness. Firstly, this study clearly demonstrates the level of relative dominance between instruments, which have been used by the national government for the climate change policy over the period 1997-2007. The criteria also help policy makers appreciate which level of policy instruments were used under the government initiatives during the specific periods when there was a reduction in GHG emissions. Results obtained by categorising instruments can explain what sort of instruments were used under the policy but not their level of relative dominance. As governments use more mixed instruments in public policy, policy makers must recognise which instruments are hard or soft in terms of clear instrument characteristics and their effectiveness. Namely, policy makers can fail to recognise that voluntary measures are not always soft instruments, and that regulations are not always hard instruments. In addition, the results from this analysis can also assist policy makers to identify the trend uses of instruments over time, which may help in reviewing instrument trends and government's instrument approaches. The criteria used for determining whether instruments are soft or hard are therefore a very useful tool for policy makers in terms of providing a clear understanding of instrument effectiveness.

Secondly, the results clearly demonstrate the level of relative dominances at the national and sectoral level. As previously mentioned, the criteria provide information that shows the level of relative dominance under each instrument. This will help policy makers to understand which instruments are utilised by government to intervene at the national and sectoral level. Each instrument is employed by the national government and is intended to meet their individual goals, but with differing levels of government control. There is thus a need for reviewing all instruments by the level of government controls and the effectiveness in reducing GHG emissions. This is critical prior information for policy makers before policy implementation.

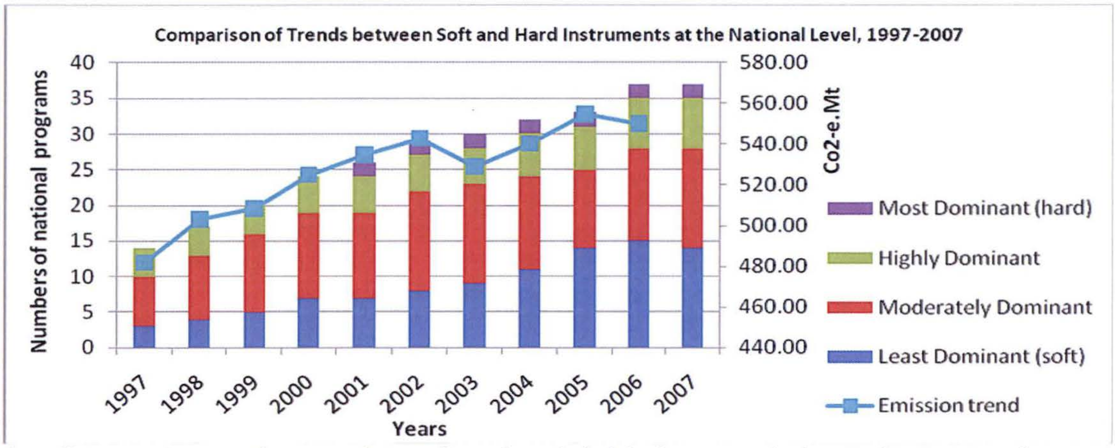
Finally, the results obtained under the criteria create a clear picture of the preferences of the government's own instrument approaches in terms of reducing GHG emissions. As shown in the results, a range of initiatives in each sector implemented a variety of instruments, using different instrument levels. The results indicated that some preferences for particular instrument approaches already existed in the policy approach of the national government. Therefore, understanding the government's preferences instruments may allow policy makers to recognise what level of instrument coerciveness (by adopting different instrument elements i.e. penalties, monitoring and competition), should be applied and whether the level needs to be revised to better achieve policy cffectiveness and emission reduction. The possible influences of the choices of policy made during the given periods are an important consideration. However, the primary purpose of this study focuses on describing to classify relevant instruments and to address the level of coerciveness, and the outcomes of such instruments.

This section describes three major significances of using the criteria, namely: the criteria can; (i) analyse relative dominance between instruments (i.e. regulatory, economic, and mixed instruments), (ii) identify the level of relative instrument dominance at national and sectoral level (i.e. 'soft' or 'hard' instruments) and (iii) review the preferences of instrument use by government in terms of reducing GHG emissions (i.e. incentive-based, monitoring, penalties and competition).

The criteria used for determining whether instruments are 'soft' or 'hard' are thus a very significant tool especially for policy makers who review climate change policy and the national initiatives from an instrument point of view in order to examine a clear picture of instrument characteristics and their effectiveness in order to reduce greenhouse gas emissions.

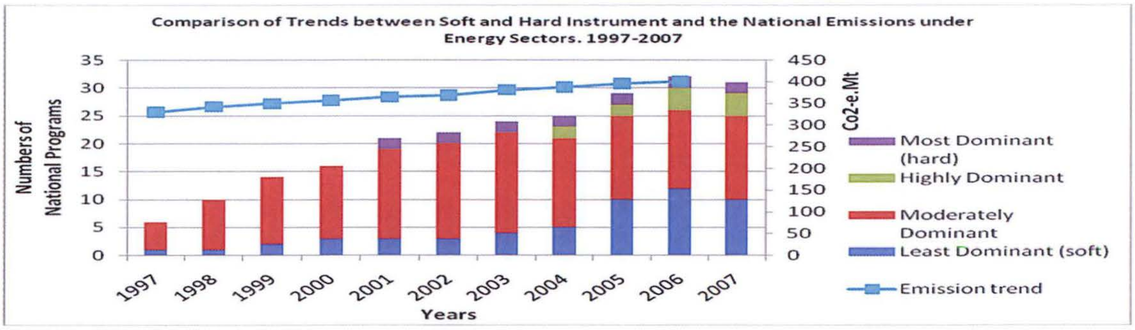
5.3.3 Alternative Explanations of the Findings

In this section, the study will present two alternative explanations of the findings drawn from the results by the proposed method used for determining whether instruments are 'soft' or 'hard'. Firstly, results obtained by the method also show a comparison between trends of instrument relative dominance and emission trends. This study provided the comparison based on the Australian national initiatives for climate change policy over the period 1997 to 2007. As can be seen in the results in

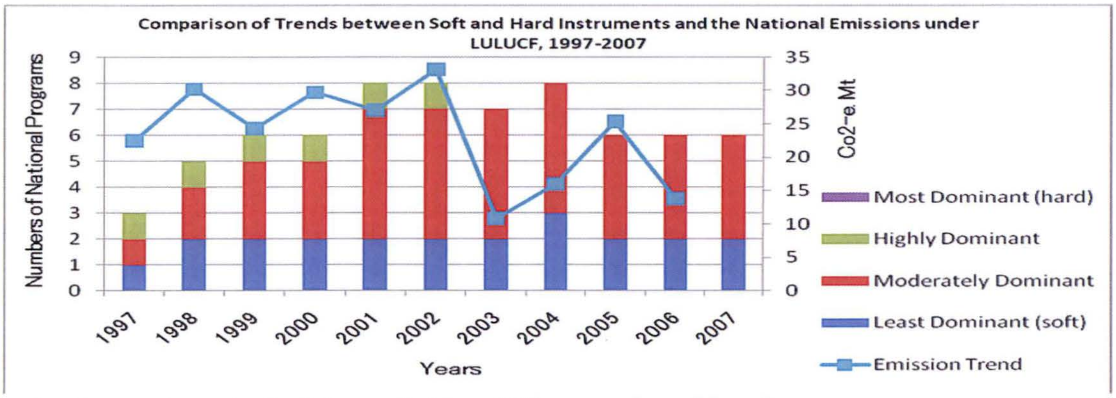


the figure above, the number of national initiatives tended, at the same time as increasing the adoption of much softer instruments over time, to witness significant emission growth (refer Figure 5.52, p.167, reproduced here). This clearly reveals that the number of instruments contained in the national approaches during the period did not reduce the GHG emissions overall.

In terms of trends at the sectoral level, the results also reveal interesting relations between trends of instrument dominance and emission trends. The results in the figure below for the energy sectors are the most critical as the largest GHG emitting sector in the country, demonstrating significantly increased emissions, despite the introduction of a number of instruments varying in power from soft to hard (refer Figure 5.53, p.168, reproduced here).



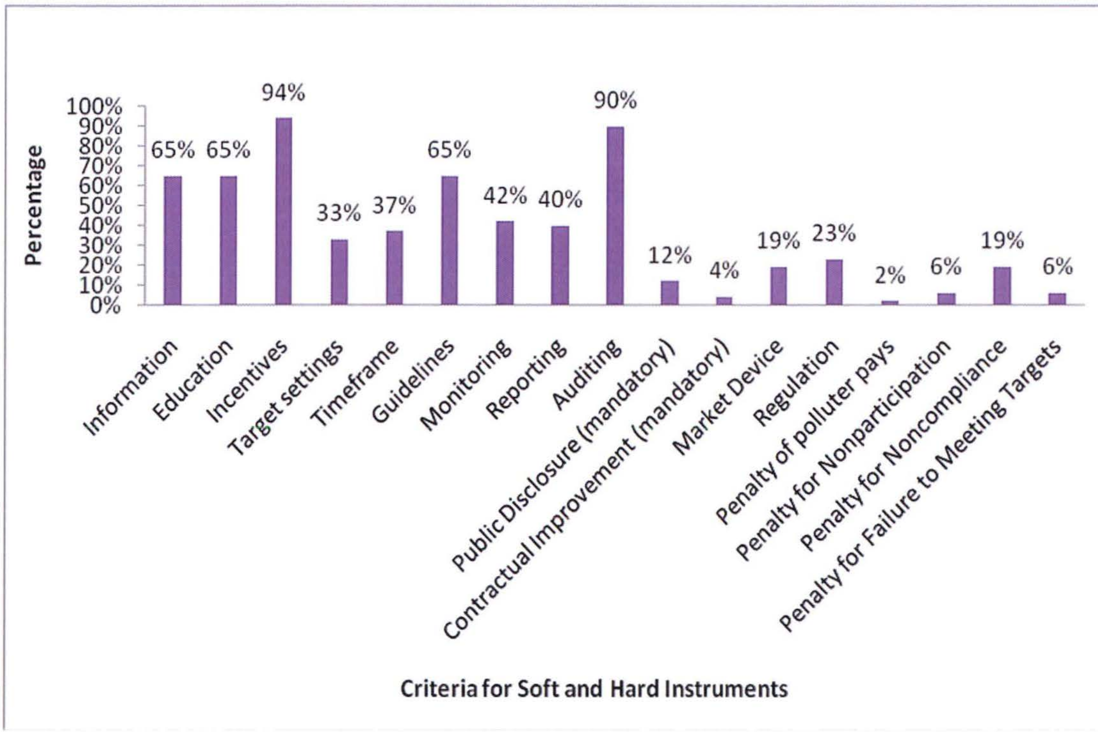
On the other hand, the comparison under LULUCF at the national level, shown in the figure below, demonstrates significant reductions in GHG emissions over time, although the level of instrument dominance was relatively softer than in the energy



and other sectors (refer Figure 5.56, p.170, reproduced here).

An explanation for the reduction in emissions might be that this resulted from a few state governments such as Queensland and New South Wales, establishing regulations banning land clearing (AGO 2005; Forest NSW; 2005; IPRT 2006; and Crowley 2007). Their approaches could be much harder instruments compared to the national ones (as mentioned in Chapter Four).

Secondly, results obtained by the criteria can also illustrate government's preference for instrument frameworks through the selected criteria (i.e. selecting which are most preferred less preferred and most avoided), while evaluating the Australian national initiatives contained in the climate change policy over the period 1997-2007. These results shown in the figure below, suggest that during the period the government used soft-based instrument approaches (refer Figure 5.58, p.172, reproduced here).



In addition, the results are likely to have been based on three levels of instrument framework selection, including: most preferred, less preferred and most avoided elements for instrument. Firstly, the national initiatives have shown a strong preference for incentive based, information-based and auditing based approaches. Secondly, the approaches may have less preferred elements by strict governmental interventions: monitoring and reporting, and clear target frameworks: specific target setting and timeline. Thirdly, the results also indicate that government may have avoided instrument elements such as penalties, public disclosures and competition during the period; these elements are normally imposed by government on stakeholders to create a more competitive and more enforceable environment.

In this section, therefore, this thesis discovered these two alternative explanations including: that criteria can present a comparison between trends of relative instrument dominance relations and emission trends, and that the method can illustrate the government's preference for instrument frameworks utilising the selected criteria, (i.e. which are most preferred, less preferred and most avoided). These results are significant, in terms of determining the level of policy instrument activities, however, these points are nevertheless important and can be considered as a critical part of policy analysis. Therefore, this analysis will prove useful in future studies in policy instrument analysis and may be applied more broadly in other fields of public policy.

5.3.4 Summary

In summary, the objective of this section was to discuss the findings obtained under the criteria used for determining whether Australian Climate Change Policy 1997-2007 was 'soft' or 'hard' and also to evaluate the trend uses. Five objectives were established in the sectional discussion, namely: the major findings of this chapter; significance of the findings and alternative explanations of the findings. Firstly, in respect of the major findings, interestingly, these results by instrument categories found a tendency to increase mixed instruments, which demonstrates policy makers encounter more difficult understandings of determining which instruments are 'soft' and 'hard'. Another finding also suggests that Australian national initiatives during the period 1997-2007 were largely reliant on relatively softer instruments, showing a tendency to increase softer instruments over time. In light of the significance of the findings, this section concluded that the criteria are a very useful tool to examine a clear picture of instrument characteristics and their effectiveness, especially for reducing greenhouse gas emissions. Furthermore, this section also suggests alternative explanations of the findings by: looking at a comparison between trends of instrument power relations and emission trends; and an illustration of government's preference for instrument frameworks, through the selected criteria (i.e. which are most preferred; less preferred; and most avoided). With respect to the study's limitations, this section describes a few limited activities throughout this study, namely: different instrument categories between UNFCCC and Australian national reports; and limited data collections. Lastly, a number of suggestions for further study were identified, including: a horizontal evaluation of instrument uses among other nations, or a vertical evaluation among different jurisdictions at the domestic level. The following section presents the conclusion of this chapter.

5.4 Conclusion

This chapter presented the case study to assess how the Australian government allocated their adoption of 'soft' and 'hard' instruments during the period in terms of reducing GHG emissions during 1997-2007.

It has met the primary objective of this chapter to demonstrate the Identification & Trend Analysis/ Method for illustrating trend use of 'soft' and 'hard' climate policy instruments, in order to fulfil the second aim of the overall thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim. Furthermore, the Identification & Trend Analysis/ Method comprises two approaches devised in this thesis, namely: CCPIC for classifying climate policy instruments and DSHCI for distinguishing between 'soft' and 'hard' instruments in climate policy.

In order to achieve this objective this chapter applied the two approaches for the trend use of 'soft' and 'hard' instruments and examines analysis of its empirical case studies. This chapter also considered three aspects of the above policy analysis, including: a) the types of policy instruments utilised by the Australian government during 1997-2007, b) how such instruments vary according to the criteria developed in this thesis for assessing 'hard' and 'soft' policy and c) what was the trend usage of such policy over time.

The results in this research presented a clear picture of distributing instruments under the national initiatives, and also found that 'mixed instruments' were highly dominant in the national approaches and tended to increase over the period. The results further found that the national government utilised much softer instruments for its policy to reduce GHG emissions. In terms of the last target, the government tended to increase its use of much softer instruments during the period.

The following chapter further demonstrates the Effectiveness Analysis/ Method to address the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions in the Australia's climate policy during the period, in order to fulfil the second aim of this overall thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim of the overall thesis.

Chapter Six

'Soft' versus 'Hard' Climate Policy Instruments

6.0 Introduction

The primary objective of this chapter is to demonstrate the Effectiveness Analysis/ Method for identifying the effectiveness of both 'soft' and 'hard' instruments in reducing GHG emissions in the case of Australia's climate policy during 1997-2007, in order to fulfil the second aim of this overall thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim of the overall thesis. The results in this chapter allow this thesis to conduct a further discussion on the relative effectiveness of 'soft' and 'hard' instruments for reducing GHG emissions, which will be further discussed in the following chapter.

For the Effectiveness Analysis/ Method, this thesis has devised the Synthesised Instrument Analysis [SIA], which includes a variety of key aspects into five analytical perspectives, namely: *Descriptive perspective*; *Transformative perspective*; *Analysis of instrument design*; *Evaluation of actual effectiveness*; and *Discussion*. Chapter Six demonstrates the application of SIA for evaluating the effectiveness of the 'soft' and 'hard' instrument activities in the case of Australia's climate policy.

In order to accomplish the primary objective of this current chapter, two case studies are presented. As identified in Chapter Five, the MRET is a 'hard' instrument and the Greenhouse Challenge Program [GCP] is a 'soft' instrument (See Appendix 4.1). Both programs were well known major initiatives for reducing GHG emissions. The MRET was intended to have a strong governmental and legislative intervention. On the other hand, the GCP was intended to have less intervention. This study evaluates these critical instruments in order to determine the relative effectiveness of 'soft' and 'hard' instruments. This chapter concludes with the demonstration of the study's method for the analysis of the effectiveness of 'soft' and 'hard' instruments in reducing GHG emissions in the case of Australia.

This chapter is divided into three sections. Firstly, it describes the general background of these two cases. Secondly, it presents the results of the analysis of the MRET. Thirdly, the chapter examines the results of the analysis of the GCP. Finally, it finishes with the analysis of these two case studies.

6.1 The MRET and The Greenhouse Challenge Program [GCP]

The first section of this chapter describes the significance of the two case studies: the MRET and the GCP. The MRET and the GCP were announced in the *1997 Safeguarding the Future Package*, and were intended to be highly effective long term instruments to reduce GHG emissions at the national level (AGO 2002b). In 2001, the then Prime Minister, John Howard, introduced the MRET, the only regulated program entirely mandated by federal initiatives during the Howard regime (AGO 2003d). On the other hand, the GCP was an entirely voluntary measure and an extension of a previous program. It was expected to be a strong driver for reducing GHG emissions by increasing the number of voluntary agreements between government and industry (CWLTH 1997). In 2004 the Prime Minister announced the GCP Plus, which updated the existing Greenhouse Challenge to integrate with other existing programs, the Generator Efficiency Standard (GES) and the Greenhouse Friendly Program to reduce GHG emissions (DHH 2006). Although the framework of the GCP Plus[33] was slightly changed (DEH 2006), it largely continued the original voluntary approach (AGO 2005).

In terms of determining whether instruments are 'soft' or 'hard', the previous chapter has revealed the MRET as a 'hard' instrument and the GCP as a 'soft' instrument (See: Appendix in Chapter Five). Given this, the MRET was an entirely mandatory

[33] The GCP Plus involved a limited requirement for penalty for non-participation: the GCP Plus required that Australian companies join, where a company receives fuel excise credits of more than AUD 3million and requires the proponents of large energy projects to participate.

framework, a 'hard' instrument. In contrast, the GCP was intended to be a completely voluntary framework, a 'soft' instrument. Both were expected to be the most important instruments under national initiatives during the period, which is partly why they have been chosen for this study, in terms of resulting in a strong contribution to the reduction of GHG emissions over the long term. It is therefore appropriate to determine the relative effectiveness of these 'soft' and 'hard' instruments in reducing GHG emissions. The following section will examine the effectiveness of the MRET.

6.2 The MRET

This section seeks to understand the effectiveness of the MRET (2001-2007) as a 'hard' instrument using the previously explained method (Chapter 5). The case study will be examined firstly from a 'descriptive perspective', and secondly from 'transformative perspective'. The 'instrument design' will be addressed, and the 'actual effectiveness' evaluated. Finally key aspects of the case study will be discussed.

6.2.1 Descriptive perspective

The descriptive perspective includes consideration of primary targets, time lines, instrument approaches and performance indicators

The primary targets of the MRET were:

- to encourage the additional generation of electricity from renewable sources;
- to reduce the emissions of greenhouse gases; and
- to ensure that renewable energy sources are ecologically sustainable.[34]

Specifically, the program aimed to increase the functions of renewable energy sources in Australia's electricity mix by an additional 2%, or 9,500[35] GWh, per annum by

[34] Renewable Energy (Electricity) Act 2001, s3

[35] The number of 9,500 GWh per annum was found as an inappropriate count and revised. The estimate of future electricity requirements used by the Working Group in 1999 (205,000GWh in 2010) on which the 9500GWh target was chosen is out of date. A more recent estimate puts the figure at 230,000GWh (ABERE, 2003). An additional 12,820 GWh, not 9500 GWh, will be required just to maintain the 2% increase in renewable since 1997(Kant and Mercer 2006).

2010 (AGO 2002b). The program also aimed to achieve an additional 2% in energy generation targets during the period from 2001 to 2010 (AGO 2005), with the targets remaining in place until 2020, when the MRET was to end (CWLTH 2003).

With respect to this approach, the MRET was introduced as a regulatory instrument by the federal government during the Howard era (AGO 2002b). The method used in this thesis recognises that the MRET was a hard instrument (at the most dominant level) in terms of the national initiatives over the period, to achieve reductions in GHG emissions. Figure 6.1 below illustrates the detail of the key criteria used in the Identification & Trend Analysis/ Method in order to judge the MRET's instrument level.

Figure 6.1: Instrument level & Key 'Soft' and 'Hard' Criteria

Instrument level	Criteria	
The most dominant level 14/ 17	Information Provision	√
	Educational Support by Government	√
	Incentives and subsidies by Government	√
	Specific and measurable Emission Reduction Targets in a program	√
	Timeframe in a program	√
	Guidance or Guidelines for implementation	√
	Monitoring	—
	Reporting and Certification	√
	Auditing, and Reviewing and Certification	√
	Public Disclosure (mandatory)	√
	Committed Contractual Improvement	√
	Any Market Device or creation of competitiveness	√
	Government Regulation for Standards	√
	Government Penalty of Polluter Pays	—
	Government Penalty for Nonparticipation	—
	Government Penalty for Noncompliance	√
	Government Penalty for Failure to Meet Targets	√

Adapted by Chapter Five

Figure 6.1 shows that most of the criteria under the Identification & Trend Analysis/ Method were covered in the MRET, which could therefore be defined as a hard instrument at the most dominant level. However, a few criteria were not involved, namely: monitoring, penalties for polluter pays, and penalties for non-participation. The program required governmental authorities to provide certification and audits but not a monitoring process. It basically imposed penalties on not meeting individual targets, and on noncompliance, but not on polluter pays and non-participation. However, on balance, this method above shows that the program is a hard instrument.

In terms of reducing GHG emissions, the major performance indicator of the MRET is the increase in Australia's renewable electricity generation, which represents the amount of renewable electricity generated and potentially eligible under the *Renewable Energy (Electricity) Act 2000*, expressed as a percentage of the mandated target over time (ORER 2004b). The following section will consider the transformative perspective of the MRET.

6.2.2 Transformative perspective

With respect to the transformative perspective, Figure 6.2 below also describes the instrument trends in the level of instrument use of the MRET. It can be concluded that the Australian government basically continued the same level of strong instrument dominance in the MRET from 2001-2007 in order to reduce GHG emissions.

Figure 6.2: Trends in the Level of Instrument Use, 1997-2007

Programs	Duration	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
MRET	2001-2010							Regulatory			

Adapted by Commonwealth of Australia 2002, 2005; and interviews. AGO 2002b. *Australia's Third Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. URL:<http://www.greenhouse.gov.au>. Consulted on 15 August 2008. AGO. 2005. *Australia's Fourth Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change*. URL:<http://www.greenhouse.gov.au>. Consulted on 15 August 2008

The following section will consider the instrument design of the MRET.

6.2.3 Instrument design

The 4th National Communication Report introduced the MRET as a regulatory instrument.[36] According to the method used for classifying instrument designs in this thesis, this instrument is a mixed approach with regulatory, incentive-based economic, research and information-based elements.

[36] Renewable Energy (Electricity) Act 2001, s3

The program requires companies to be licensed, set their targets, and be strictly audited if liable parties receive their Renewable Energy Certificates [RECs] and interim targets and perform at the level of these targets (CWLTH 2003). A 'performance standard' sets minima/maxima for particular goods/services and production techniques with respect to the use of renewable energy sources and GHG emissions (IPCC 2007b). Thus the instrument can be structured as a 'performance standard' type of regulatory instrument. Furthermore, the MRET also involved other instrument elements, namely economic and research. It can be classified as a pure incentive oriented program within the category of incentive-based instruments. Incentive-based economic instruments are government programs to reduce costs for development and diffusion of new technologies by imposing cost on the consumer with industry paying in order to stimulate the development and diffusion of new technologies (Bemelmans et al. 1998). Research instruments generate innovative approaches to a low carbon society with reduced greenhouse gas emissions (European Communities 2007). In practice, the Federal Government has implemented a variety of cooperative financial support programs through the MRET such as REEF [Renewable Energy Equity Fund] and REDI [Renewable Energy Development Initiative] (AGO 2005). The MRET also provided information and education (CWLTH 2003). These can be recognised as information-based instruments (see Chapter Three). In light of these supports, the program was not only purely regulatory but also included economic, research and information-based elements.

In terms of instrument design from a theoretical perspective, the MRET program involved a mixed approach with performance standards as a regulatory instrument; as an incentive-based economic instrument, with research and information-based elements. Although economic, research and information-based elements can be seem to be supportive of the achievement of GHG reduction, the most dominant function of this program is its regulatory element. Thus, this thesis assesses the instrument design of the MRET according to the criteria for regulatory instruments. Figure 6.3 below describes the theoretical effectiveness of regulatory instruments against key criteria for assessing reduction in GHG emissions.

Figure 6.3: Instrumental Effectiveness for: Regulatory Instruments

Criteria	**Regulatory instruments**
Environmental Effectiveness	High
Cost-Effectiveness	Low
Distributional Equity	High
Political Acceptability	Medium
Administrative Feasibility	High

[Adapted from Chapter Three]

Firstly, this theoretical assessment shows that regulatory instruments may present: high environmental effectiveness (reducing GHG emissions), low cost effectiveness, high promotion of distributional equity, medium level political acceptability, and a high level of administrative feasibility. A later section will compare the actual effectiveness of the theoretical assessment. This will reveal the relationship between the two and demonstrate the differences between theory and practice in terms of effective programs for GHG reduction. The following section will consider the actual effectiveness of the MRET.

6.2.4 Actual Effectiveness

The following section will analyse the actual effectiveness of the MRET in terms of environmental effectiveness, cost-effectiveness, distributional equity, political acceptability and administrative feasibility.

6.2.4.1 Environmental Effectiveness (reducing Greenhouse Gases)

According to annual reports by the Office of the Renewable Energy Regulator [the ORER][37], the level of program effectiveness for the renewable energy industry can be assessed by consideration of both the amount of renewable energy generation accredited and the number of RECs created.

Figure 6.4 below presents the progress of these indicators during the period 2001 to 2007. The results show a tendency to increase in both areas over the period with an

[37] The ORER is a statutory authority appointed by the government, and has played a role in managing the implementation of the MRET.

increase in renewable energy generation by number of accredited renewable energy power stations and number of created RECs 2001-2007.

Figure 6.4: Number of Accredited Renewable Energy and Created RECs, 2001-2007

Year	Number of accredited renewable energy power stations	Number of RECs created
2001	124	619,906
2002	175	2,191,676
2003	196	7,719,189
2004	211	11,043,587
2005	228	15,749,644
2006	237	21,359,038
2007	253	28,190,050

[Adapted from the ORER Annual Reports. 2001a, 2002a, 2003a, 2004a, 2005a, 2006a and 2007a. Canberra. Australia]

Figure 6.5 illustrates the Interim Targets set in the MRET, the actual results against these targets and the percentage of achievement level. The results in 2001, 2002, 2008, and 2009 are not publicly available; however results are available from 2003 until the end of 2007. These results clearly demonstrate a high level of achievement in meeting the targets allocated each year toward the primary target of an increase of renewable energy sources, of 9,500Mwh per year by 2010.

Figure 6.5: Achievement of Interim Targets, 2001-2007

Year	Interim Target (Mwh, or RECs)	Actual Results (Mwh, or RECs)	Percentage of the achievement level
2001	300	Not available	Not available
2002	1,100	Not available	Not available
2003	1,800,000	1,708,951	94.94
2004	2,600,000	2,502,229	96.24
2005	3,400,000	3,335,040	98.09
2006	4,500,000	4,500,005	100
2007	5,600,000	5,741,131	102. 52
2008	6,800,000	Not available	Not available
2009	8,100,000	Not available	Not available
2010	9,500,000	Not available	Not available

[Adapted from the ORER Financial Reports, 2004b, 2005b, 2006b, 2007b and from 2008b Canberra. Australia]

From these results it can be concluded that the MRET program had a strong environmental effectiveness in response to the goal of reduction in GHG emissions, indicating the instrument had reduced GHG emissions, though the primary goal of this program has not been completed yet. The following section will describe the level of cost effectiveness.

6.2.4.2 Cost-Effectiveness

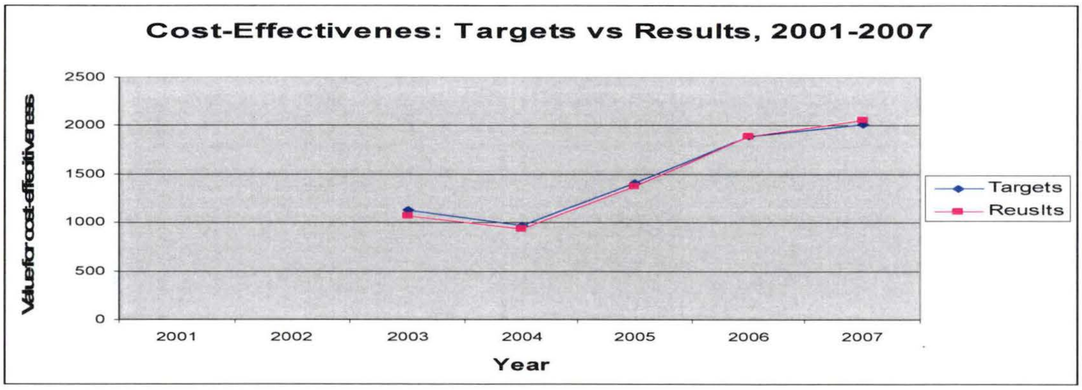
In terms of examining the level of cost effectiveness, data between the interim targets and actual results can be compared over the period. Figure 6.6 describes the value of both interim targets and the actual results. Figure 6.7 then presents a comparison of cost effectiveness between the interim targets and the actual results over the period. Again, the data in 2001 and 2002 are not available.

Figure 6.6: Values for Interim Targets and Actual Results, 2001-2007

Year	Interim Targets		Actual Results	
	Targets/Costs ($)	Values	Targets/Costs($)	Values
2001	Not available	Not available	Not available	Not available
2002	Not available	Not available	Not available	Not available
2003	1800/1605	1121.5	1,708,951/1605	1064.8
2004	2600/2684	968.7	2,502,229/2684	932.3
2005	3400/2423	1403.2	3,335,040/2423	1376.4
2006	4500/2384	1887.6	4,500,005/2384	1887.6
2007	5600/2781	2013.7	5741,131/2781	2064.4

[Adapted from the ORER Annual Reports. 2001a, 2002a, 2003a, 2004a, 2005a, 2006a and 2007a; and the Financial Reports 2003b, 2004b, 2005b, 2006b and 2007b Canberra. Australia.

Figure 6.7: A Comparison of Cost-Effectiveness: Targets vs Results, 2001-2007.



Adapted by the ORER Annual Reports. 2001a, 2002a, 2003a, 2004a, 2005a, 2006a and 2007a; and the Financial Reports 2003b, 2004b, 2005b, 2006b and 2007b Canberra. Australia.

These results show that the program seemed to achieve these targets, as intended over time. The MRET was highly cost effective. The following section will examine the distributional equity.

6.2.4.3 Distributional Equity

In terms of equity, the program provided a range of grants for additional renewable sources. For instance, the government spent more than AUD300 million on encouraging the development of existing renewable technologies, the commercialisation of new technologies and industry capacity building towards the 2010 target level, such as Renewable Energy Action Agenda (CWLTH 2003). It also involved stakeholders improving their understanding of the program through public forums, strong linking with government agencies, and sharing information with interest groups at community levels (ORER 2008a). This provided equity. In terms of responsibility, the program did not level any penalty on polluters. In terms of environmental sustainability, the *Renewable Energy (Electricity) Act 2000* (s.3) states that an object of the MRET is to reduce GHGs[38]. The program was primarily intended to be a long-term greenhouse response measure achieved through the development of industry capacity, although it generated direct greenhouse emission reductions in the medium term' (CWLTH 2003). It could be said therefore that the program was concerned with environmental sustainability. These three aspects, equity, responsibility and environmental sustainability, suggest that the program considered a variety of elements for meeting the demands for distributional equity. The following section will examine the political acceptability.

6.2.4.4 Political Acceptability

The MRET involved a tradable system, called RECs under the Act at the national level. It was expected to have a positive influence domestically and internationally in providing global contributions (Rossiter and Amarjot 2006). In terms of market ideology, the trading system was a new form of 'currency' used to demonstrate compliance with the government's new mandatory targets and additional renewable electricity generation for the environmental benefits held in the domestic market pool (Rossiter and Amarjot 2006). Market ideology was thus largely dominant in this program. A number of flexibilities can be found in the modification of the MRET, including: adapting a range of renewable energy sources and technologies to be

[38] Renewable Energy (Electricity) Act s.3

eligible over time such as hydro and wind (ORER 2008a); and adapting a voluntary domain called 'voluntary surrender'[39], which allowed that voluntary surrenders have also been eligible to register since 2006 (ORER 2008a). These incremental changes indicate the MRET was flexible. These three aspects, global contribution, market ideology and flexibility, suggest that the program involves various factors of political acceptability. The following section will examine the administrative feasibility of the program.

6.2.4.5 Administrative Feasibility

In terms of administration and transaction, flexibilities such as the tradable domain (CWLTH 2003) and updating the eligibility of renewable energy sources over time (ORER 2008a), may have encouraged industry technological innovation and adaptation. The 'voluntary surrender' system (ORER 2008a) and variety of government incentives (CWLTH 2003) allowed the program to have more cost efficient processes. The program involved sharing responsibility with stakeholders (the ORER 2008a), which may have also avoided extra complexity and costs.

In terms of enforceability, imposing penalties on participants for non-compliance ensures the maintenance of the integrity of the program. For instance, the ORER enforces compliance with the Act, by assessing the number of RECs surrendered and by paying discharge liabilities. Furthermore, the ORER annually operated a reporting process noting whether the program worked or not (ORER 2008b).[40] Another factor is

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[39] "'Voluntary surrender' means extinguishing the many renewable energy certificates that had built up under GreenPower but it also allows any registered owner to be eligible to surrender. In September 2006, the *Renewable Energy (Electricity) Act 2000* was amended with additional rules so that any registered owner of a renewable energy certificate may now surrender that certificate to the Regulator.

[40] The period, over which each annual target must be achieved, which, except for 2001, is a full calendar year. The reports are based on a full calendar year's acquisitions of electricity. 'These liabilities are then acquitted 6 weeks later by 14 February (annual compliance date) unless it is a weekend.' Furthermore, the Act places obligations on both eligible and liable parties to report their activities during the calendar compliance year. In addition, liable parties also surrender RECs or pay a Renewable Energy Shortfall Charge [RESC] to meet their liabilities. This process is subject to receiving, where required, third party or other data to verify compliance statements. 'The liability compliance element is the key support mechanism for the MRET because without a requirement to surrender RECs to the Australian government each year, the incentive to register and trade RECs in the REC market would be reduced' (ORER, 2008b, p.6).

the penalty for not meeting targets. A penalty of $40/MWh[41] was imposed on any current owners who did not meet their targets (ORER 2008a). Figure 6.8 below illustrates the level of program compliance in terms of program outputs against performance standards 2001-2007.

Figure 6.8: Enforcement and Compliance under MRET, 2001-2007

Output Performance Standard	*2003*	*2004*	*2005*	*2006*	*2007*
Number of RECs validly created in the year	4,245,008	4,013,462	5,123,958	5,663,467	7,435,046
Total REC liability as a percentage of the annual renewable energy target	95 05%	96 24%	98 09%	100%	100%
Total number of RECs surrendered in the year as a percentage of the target	95 82%	96 95%	99 01%	99 97	99 45%
The percentage of accreditation applications (within six weeks of receipt of completed applications and other necessary information)	93 33%	100%	100%	100%	100%
The percentage of RECs annually created that are validated	82 70	98 37%	98 61%	96 12%	98 04%
The number of liable parties having shortfalls	4	6	6	5	4
The sum of all shortfalls expressed in RECs	1 638	2,827	8,486	1,082	31,338

[Adapted from the ORER Annual Reports. 2001a, 2002a, 2003a, 2004a, 2005a, 2006a and 2007a. Canberra. Australia] *No data available for 2001 or 2002.

These results show a high compliance rate by industry. At the same time, a large amount of renewable energy sources were covered each year. This shows that the MRET was enforceable in its own terms, and also achieved successful compliance.

In terms of transparency and credibility, the ORER was covered by legislation, and was responsible for preparing two annual reports, including: the financial annual report [42] and annual report (AGO 2004c). The ORER enforced penalties and conducted audits according to the legislation to ensure that the program was conducted as intended (ORER 2008c). Such strong governmental intervention can be expected to involve high transparency. Figure 6.9 below describes reporting compliance by government authorities, as indicated by publicly available annual reports and financial reports 2001-2007. Although a review by an independent panel

[41]The penalty for meeting targets though 10% of the total requirement can be carried forward to the following year's REC liability (ORER 2008a).

[42] In accordance with section 63 of the *Public Service Act 1999*, the ORER must present the Annual Report of the Office of the Renewable Energy Regulator. This report is supplementary to the annual report produced in compliance with section 105 of the *Renewable Energy (Electricity) Act 2000* which reports on the operation of the Act over a calendar (or compliance) year. This annual report outlines the activities of the Office of the Renewable Energy Regulator as they relate to the financial year funding cycle (ORER, 2003b). While the ORER has been established since 1 April 2001 this report is the first financial year annual report for the Office, as prescribed agency status was granted from 1 July 2003. Previous reporting on the financial performance of the Office has been included in the Department of the Environment and Heritage's annual reports.

[42] The annual report, which is an administrative report completed for a calendar year and provides various data about the administration of the MRET, such as: the number of RECs that have been created, registered and surrendered (AGO 2004).

was conducted in 2003 only, the result shows the total level of transparency and credibility was likely to have been high.

Figure 6.9: MRET Reporting Compliance

Report	2001	2002	2003	2004	2005	2006	2007
Annual Report	√	√	√	√	√	√	√
Financial Report	√	√	√	√	√	√	√
Independent Review			√				

[Adapted from the ORER Annual Reports. 2001a, 2002a, 2003a, 2004a, 2005a, 2006a and 2007a; and the Financial Reports 2003b, 2004b, 2005b, 2006b and 2007b; and CWLTH 2003.]

In terms of practicability, a number of critical recommendations were made by an independent Senate Committee review and Working Group in 2003 (CWLTH 2003). The major issues were as follows: the intention of the Act to accept a national emission trading scheme; changing target parameters of the scheme (i.e. targeting 10% of renewable energy by 2010, increasing the target beyond 2010, and continuing the scheme beyond 2020); and encouraging efforts beyond 'business as usual'(Kant and Mercer 2006). Later, the government acknowledged 30 recommendations from the independent review and agreed with the 14 recommendations (AGO 2004c). This shows that the government recognised and acted upon urgent issues. It follows from this that the MRET had a certain level of practicability. Given these four key aspects, namely, minimising administrative and transaction costs, enforceability, transparency, credibility, and practicability, the MRET may have been administratively feasible.

This section considered instrument effectiveness. The following section will present a *discussion* reflecting the results of the MRET, to determine the effectiveness of it as a 'hard' instrument.

6.2.5 Discussion

In discussing the MRET's effectiveness, four perspectives are presented, including: the significance of the MRET; major criticisms of the MRET; the MRET's overall effectiveness; and the summary of the discussion and this study's contribution. This section will then present a short summary for this section.

6.2.5.1 Significance of the MRET

The MRET was one of the most significant programs in Australia's climate change policy. This thesis has classified it as a hard instrument. The primary goal of the program was to increase the amount of renewable energy generation. In specific terms, the government played a central role in its implementation with legislation. Under the legislation, the program created a tradable unit (RECs), and was also capable of charging for not meeting targets, and/or a lack of compliance. These features show that the program was expected to have strong governmental and legislative intervention, in terms of reducing GHG emissions. However, various critiques of the MRET have emerged, which will now be discussed.

6.2.5.2 Major criticisms of the MRET

Criticisms of the MRET include that:

- the targets are too low and too short term;
- there is a lack of funding support for renewable energy technology;
- the weak charge for shortfalls imposed on retailers has resulted in less responsibility and low motivation;
- the uncertainties of the evaluation report[43]; and
- the uncertainty of the 'business as usual'approach in the MRET to actual emissions abatement under the total reliance of the 'business as usual'approach.

[43] A number of uncertainties under the MRET evaluation framework were also criticised: (a) a lack of clarity and purpose in the Act itself (b) reviewing the effectiveness after only 2 years of operation was too soon (c) and too much consideration of claims by stakeholders (Kent and Mercer 2006).

The following section will discuss aspects of this study's methodology. It will also illustrate relationships between its findings and the above criticisms.

6.2.5.3 MRET's overall effectiveness

This section will summarise the results from four elements of this study's method: 'descriptive' perspective', 'transformative perspective', 'instrument design' and 'actual effectiveness'.

The descriptive perspective gave an overview of the MRET, as a 'hard' instrument. The transformative perspective presented the trend in the level of instrument use of the MRET. This showed that the trend remained at the most dominant level over time. Regarding instrument design, the method found the program actually was a mixed instrumental approach (regulatory, incentive-based economic, and research instruments), although a national report defined the MRET as a regulatory instrument (AGO 2002b; 2005). However, it recognised that the regulatory instrument was the most dominant element in the program, due to its primary focus on strong government and legislative intervention to achieve its goals. It thus concluded that the theoretical assessment of regulatory instruments would be most appropriate for estimating effectiveness. The criteria adopted here suggest that regulatory instruments may present high environmental effectiveness (reducing GHG emissions), low cost effectiveness, high promotion of distributional equity, medium level political acceptability, and a high level of administrative feasibility.

In terms of actual effectiveness, the results here show that the program met the demands for its performance indicators (see: environmental effectiveness). This reveals that the MRET achieved environmental effectiveness for reducing GHG emissions in 2001-2007. However, in practice, criticisms still remain that the program targets were always too low and too short term to influence emissions abatement. For example, the existing registration of RECs could already see the target being met as early as 2010. This would lead to less motivation for suppliers and retailers for further actions (Warwick and Smith 2002). Such low targets may be a reason for short term targets, and it was suggested that these should be changed to longer periods with higher targets (Riedy 2005). The MRET is the first mandatory national certificate program. The target is a modest initial GHG emission reduction goal and does not represent a significant renewable initiative in Australia (Kelly 2007). The MRET target is certainly lower than that of some countries in Western Europe that have also established renewable energy targets. A key policy instrument must guide a strong initiative by setting a strong target (MacGill et al 2006); the MRET is a mandatory instrument, however, it fails to recognise this. Although questions about the target level and term still remain for future improvement, this method helped to identify whether the program met the demands for GHG reductions over time, as intended. In terms of cost-effectiveness, the results showed that the MRET met its cost value against targets, as intended. Achievement of cost effectiveness in a program represents the largest influence on cost values or on cost efficient provision toward an outcome (Vedung 2005). These factors suggest that the MRET achieved the least cost impact in terms of reducing GHG emissions.

The results from the distributional equity applied in this study showed a number of the elements in the MRET, namely a variety of incentives for renewable technology; extra incentives from the trading system; and equally shared responsibility among stakeholders. Although the program provided elements for responsibility with no penalties for polluter pays, it considered the capacity of environmental sustainability to direct greenhouse emission reductions in the medium and long term, in developing social capacity. However, in terms of the incentives, there was a lack of funding support for renewable energy technology by the federal government (AGO 2002a). For instance, the federal government invested unequally in energy and transport subsidies between the fossil fuel industry (97% of total energy and transport subsidies) and the renewable energy industry (3%) for improving energy efficiency. This represents the absence of funding support by government in the MRET (ISF 2007). This also results in less opportunity for competitiveness and job creation, which discourages the creation of additional renewable energy sources (AGO 2001b; 2002c). Furthermore, insufficient incentives from the government discourage significant development of renewable technologies. For example, a new power station and smaller renewable generators, such as Photovoltaic cells require high costs in terms of the infrastructure. On the other hand, refurbishing an existing power station such as a hydro energy plant does not incur such costs (MacGill et al. 2006; Lewis et al. 2007).

These factors suggest that although this study has found that a number of elements in the program involved distributional equity, in practice, the absence of incentives by government seems to have undermined equity.

Results from the political acceptability aspect of this study showed a number of elements involved in the MRET. There is a strong contribution to global action by the proposed tradable system at the domestic level; flexibilities in the Act by updating eligible renewable sources over time and adapting the voluntary domain such as 'voluntary surrender'; and market ideology by including the domestic market pool in renewable electricity generation. However, in practice, the MRET is still open to criticism for not allowing more global access. The MRET in Australia is the Renewable Portfolio Standard type, where governments manage a mandatory system by purchasing a certain amount of renewable energy sources (Berry 2002). However, such a significant market-based instrument should not only create a domestic target and market pool, but should also be based on an international standard, which would allow more access to a global market in the future (e.g. New Zealand's renewable energy target is based on the Kyoto target, but is not mandated) (Kelly 2007; Lewis et al 2007). From this perspective, the MRET seems to be a weak global action.

In terms of flexibilities of the limited effectives, the Act needs to be improved. Most of the developed renewable technologies installed in Australia are owned and facilitated by the same operators that hold coal-fired power stations. If we are to realise the significant benefits of renewable energy, then the government must establish more decentralised generation (Crawford and Angel 2002). Moreover, there is always a demand for new renewable energy sources that should be recognised with more flexibility. New technologies such as bioenergy and biomass sources can be helpful for creating renewable technologies. However, the current system still allows only limited eligibility for registrations for these new technologies (Saddler et al 2004). In terms of market ideology, the market design in the RECs system seems to have loopholes and weaknesses. There was uncertainty for negotiations between energy producers and the ORER. The data in the ORER making a decision to create a baseline for calculating additional energy productions for each company is confidential. This may create unfair market benefits amongst companies (MacGill et al 2006). Furthermore, the total reliance on the 'business as usual' approach in the

MRET results in uncertainty for actual emissions abatement, such as a less competitive market price (ACCI 2003; MacGill et al 2006). The conservative approach creates less funding opportunities, which may not be long-term and predictable (Greenpeace Australia Pacific 2007; MacGill et al 2006; Lewis et al 2007). Such a fundamental structure results in minimum contributions to reducing GHG emissions (Bailey 2006).

These factors suggest that this study identified a number of elements for political acceptability in the program, namely global actions, flexibilities and market classification. However, it also identified some particular issues: the level of flexibility in the Act for example in terms of acceptance of eligibility; the level of global access; and the fundamental outline in the program such as the instrument relying on the 'business as usual' approach, still remains uncertain in terms of its effectiveness.

Results from the administrative feasibility aspect of this study showed a number of elements involved in the MRET. The strong assistance for technological innovation and adaptation were considered by allowing suppliers to be eligible anytime, obtaining voluntary domains, and avoiding complexity by sharing responsibility amongst stakeholders. Strong government and legislative intervention would create less pressure on the overall administrative and transaction costs. The enforceability was also considered by imposing penalties on participants for noncompliance. In terms of enforceability, the MRET provided for small charges to be imposed on retailers, which results in creating weak levels of responsibility (CWLTH 2000c). It would be necessary to have larger charges imposed on retailers if they failed the target levels (CWLTH 2003). The balance should thus be considered. If the penalty rate is set too low, then the environmental target will not be achieved. If it is set too high, then society as a whole may incur high costs in order to meet the target. However, in practice, investment in and output of, renewable energy was meeting the graduated targets (Nolles 2006).

In addition to the results from feasibility, this study also found that enforceability provided a high level of compliance for achieving the target levels. Although the study found a number of elements of administrative feasibility in the MRET, it is difficult to judge the most appropriate level of enforceability. Kant and Mercer (2006) also point out that, if the level of compliance met the demands, it would not be necessary to change the level. Another aspect of administrative feasibility indicated that the MRET provided a high level of practicability, and the government agreed to legislate for most of the recommendations. However, a question has emerged about the reviewing processes which only take account of the views of stakeholders for the recommendations, which should also consider other parties' ideas such as environmental NGOs (Kant and Mercer 2006). Given these issues, whilst this study identified a high level of practicability in the program, a question still remains about the way policy actors can contribute to further improvcments though the review process.

6.2.5.4 Summary of discussion

In summary, the discussion summarised the findings of MRET effectiveness from four other key stages in the method, including 'descriptive perspective', 'transformative perspective', 'instrument design', and 'actual effectiveness'. According to theoretical assessment, regulatory instruments should have a high level of environmental effectiveness (i.e. in reducing GHG emissions), low cost effectiveness, high promotion of distributional equity, medium levels of political acceptability, and a high level of administrative feasibility. However, the actual results above have showed something slightly different. Most importantly, this examination revealed that the MRET, as one of the hardest instruments in Australia apparently met its goals (i.e. environmental effectiveness, and cost effectiveness), as intended, in terms of reducing GHG emissions. However, in terms of distributional equity, political acceptability, and administrative feasibility, the results did not present a clear picture of effectiveness, although these showed that the MRET involved a number of these key elements. Furthermore, discussion here also considered relationships between the findings and major criticisms of the MRET in practice. As a consequence, although this study's method does not aim to solve specific issues of a program, some of these issues seem to be linked to the findings in this study's method. This could suggest that this study's method may be helpful for clarifying and supporting some ideas in these criticisms, but may not access details of specific issues.

The second section of this chapter has presented an analysis for examining the effectiveness of the MRET program as a hard instrument in Australia's climate change policy 1997-2007. The following section will examine the effectiveness of the Greenhouse Challenge program as a soft instrument employed over this time.

6.3 The Greenhouse Challenge Program

This section seeks to understand the effectiveness of the Greenhouse Challenge Program [GCP] as a 'soft' instrument, firstly from a 'descriptive perspective', and secondly from a 'transformative perspective'. The 'instrument design' will then be addressed, and the 'actual effectiveness' evaluated. Finally key aspects of the case study will be discussed.

6.3.1 Descriptive perspective

The descriptive perspective includes primary targets, time lines, instrument approaches, and performance indicators. The primary targets of the original GCP were:

- to achieve maximum practicable greenhouse abatement performance by members;
- to drive continuous improvement by members of their management of greenhouse gas emissions;
- to develop knowledge and experience of measuring, monitoring, managing, reporting and verifying greenhouse gas emissions and sinks; and
- to strengthen knowledge and understanding between government and industry about practical and cost-effective ways of managing greenhouse gas emissions (AGO 2003b).

Specifically, the program aimed to reach the target of 500 participating organisations by the year 2000 and 1000 participants by 2005, with the expectation that the program would achieve emissions abatements of 22 Mt CO_2-e by the year 2000. The program was designed and implemented as a voluntary co-operative partnership between government and industry to reduce GHG emissions (AGO 1999a). In 2005, the GCP was updated again to become the GCP Plus program. The GCP Plus largely continued the original Challenge's voluntary-based approach (AGO 2005).

With respect to instrument approach, the original GCP was an extension by the Howard Government of an initial voluntary program instigated by the Labor Prime Minister, Paul Keating in 1995 (AGO 2005). Howard supported the GCP as a voluntary and negotiated agreement with industry 1997-2005 (AGO 2002b). The updated program, the GCP Plus, started in 2005 and was described as a voluntary, economic and regulatory instrument in the 2005 *Fourth National Communication Report* (AGO 2005). The method used in this thesis has recognised that GCP was a soft instrument (at the moderately dominant level) in the national policy initiatives over the period, and was intended to achieve reductions in GHG emissions.

Figure 6.10: Criteria for Evaluating Instrument Level in the GCP/ GCP Plus

Instrument level	**Criteria**	**Moderately Dominant 5/17** The GCP (1997-2005)	**Moderately Dominant 5/17** The GCP/ GCP Plus[44] (2005-2007)
The moderately dominant level	Information Provision	√	√
	Educational Support by Government	√	√
	Incentives and Subsidies by Government	√	√
	Specific and Measurable Emission Reduction Targets in a program	—	—
	Timeframe in a program	—	—
	Guidelines or Guidelines for implementation	√	√
	Monitoring	—	—
	Reporting and Certification	—	—
	Auditing, Reviewing, and Certification	√	√
	Public Disclosure (mandatory)	—	*1[45]
	Committed Contractual Improvement	—	—
	Any Market Device or creation of competitiveness	—	—
	Government Regulation for Standards	—	—
	Government Penalty of Polluter Pays	—	—
	Government Penalty for Non-participation	—	*2[46]
	Government Penalty for Non-compliance	—	—
	Government Penalty for Failure to Meet Targets	—	—

[44]The number of criteria under the GCP Plus is larger than the original GCP; because the GCP Plus was mixed with other programs. However, the extent of the original GCP itself in GCP Plus was not largely changed through the GCP Plus over time, except in its limited requirements for mandatory participation and its incentive-based approach (i.e. if a company wants to receive fuel credits back, the company must join the program). Thus the transformative perspective only shows the extent of the original GCP.

[45]*1:'the GCP Plus Leaders' system required that once companies were nominated as leaders, the program provided publicly discloses their emission profiles, strategies, and future directions. However, the mandatory requirement does not impose a disclosure on all firms. Thus, this element does not meet the criteria.

[46]*2: In fact, the GCP Plus involved a limited requirement for penalty for non-participation: it required that Australian companies join, if a company receives fuel excise credits of more than AUD 3million and for the proponents of large energy projects to participate. However, the mandatory requirement does not impose a penalty on all firms. Thus, this element does not meet the criteria.

[Adapted from Chapter Five]

The chart above shows the number of criteria covered in the GCP, which could be defined as a soft instrument at the moderately dominant level. The program mainly required government authorities to provide information, educational support, guidelines, and auditing, but did not impose any penalties, mandatory requirements, or market devices in its implementation. The GCP Plus program then involved a conditional mandatory requirement for imposing penalties on non-participation; however, the penalty was not imposed on all the participants, so this study's method did not conform to the criteria but still addressed significant aspects. Although the instrument was slightly changed to become a less soft instrument, it can be concluded that the GCP remained a relatively soft instrument over time.

In terms of reducing GHG emissions, the major performance indicators[47] of the original GCP were the number of participating organisations and the amount of emissions abatement. The major intention of this analysis is to evaluate the effectiveness of the GCP, though this thesis evaluates the instrument framework of both the original GCP and GCP Plus. There were two parts in the program: the first was the original GCP, and the second was the GCP Plus. A government report on the GCP Plus in 2005 suggests that a certain indicator in the original GCP is no longer applicable[48]. This thesis agrees, but the concept of the original GCP was not changed over time to raise industry participation and emissions abatement; thus the indicators developed in the original GCP will be used to evaluate the entire program (both the original GCP/ and GCP Plus), in order to determine the effectiveness of this soft instrument. The following section will consider the entire Challenge from a transformative perspective.

6.3.2 Transformative perspective

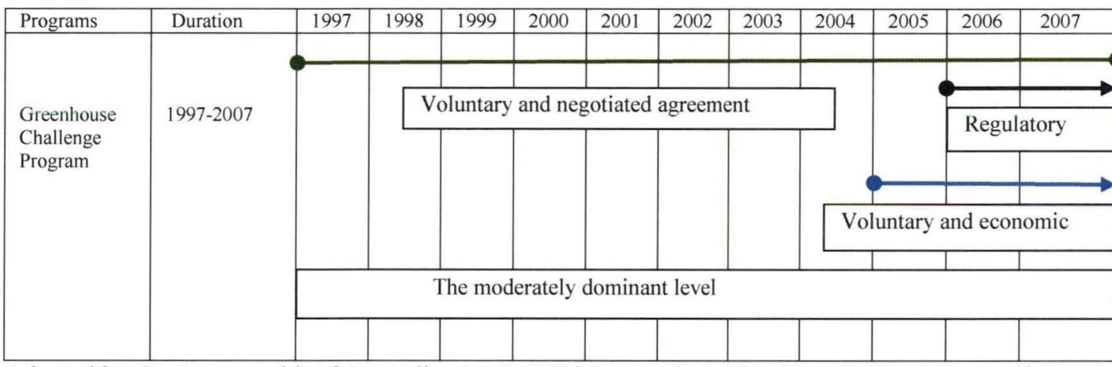
With respect to the transformative perspective, figure 6.12 below also describes the instrument trend uses of the GCP. Although the instrument was slightly changed to

[47]Although, the program looked at compliance with corporative agreements between government and industries; such as the rate of submissions and meeting of forecasts, the number of participation and emission abatements is the most priority for the program goals.

[48]The AGO stated that the mandatory requirements to join GCP Plus covers that the government's target of 1000 GC members by 2005. This is no longer accepted as a useful target (AGO 2005. p27)

become a less soft instrument, it can be concluded that the Australian government basically continued the same low level of instrument dominance in the GCP during the period in order to reduce GHG emissions. The following section will consider the instrument design of the GCP.

Figure 6.11: Transformative Perspective and the GCP (1997-2005)/GCP Plus (2005-2007)



Adapted by Commonwealth of Australia. AGO 2002b. *Australia's Third Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change.* URL:<http://www.greenhouse.gov.au>. Consulted on 15 August 2008. AGO 2005. *Australia's Fourth Communication on Climate Change: A Report under the United Nations Framework Convention on Climate Change.* URL:<http://www.greenhouse.gov.au>. Consulted on 15 August 2008

6.3.3 Instrument design

The 3rd National Communication Report by the Australian Government to the UNFCCC introduced the GCP as a voluntary and negotiated agreement (AGO 2002b), and as a voluntary, economic, and regulatory instrument in the 4th Report (AGO 2005). According to the method used for classifying instrument designs in this thesis, this instrument can be seen as a mixed approach with voluntary, incentive-based economic and information-based instruments.

The original GCP was an entirely 'voluntary co-operative partnership between government and industry' (AGO 2003b). The instrument can be categorised as 'voluntarism/ negotiated agreement' type of voluntary instrument, which is characterised by setting formal contracts between industry, sectors and authorities, but not imposing penalties for failing to achieve a target (Börkey and Lévêque 2000). Furthermore, the program involved incentives for administrative and technical support for industry to conduct GHG mitigating actions (AGO 2003b). It can also be classified as an incentive-based instrument. A 'grant' type of incentive-based economic instruments means that government reduces the costs by imposing costs on the consumer so that industry pays in order to stimulate new mitigating activities (Bemelmans et al. 1998). The GCP also provided information and education; for example it consulted members about making more energy efficient plans with less cost impacts (AGO 2003b). It can be recognised that the GCP Plus used information-based instruments (see Chapter Three). However, the instrument framework in the GCP Plus is slightly different to the original GCP, but possesses very similar characteristics.

The GCP Plus included a limited compulsory requirement for compulsory participation by companies receiving fuel excise credits of more than AUD 3million and for the proponents of large energy projects (AGO 2003b). However, the majority of companies in Australia still had free choice as to whether to participate, and the agreement did not impose penalties for non-participation, non-compliance or for not meeting targets (AGO 2003b). Thus the program still broadly retained its voluntary approach, providing information-based instruments (i.e. information and education). In addition, although the program retained a 'grant' type of incentive-based economic instrument, it introduced another type of incentive which was the 'GCP Plus Leaders'; where the government recognises companies as leaders if they achieve beyond the minimum requirements of the program (AGO 2005). Such reward incentives can be categorised as a 'subsidy' type of incentive-based economic instrument, where the government subsidises companies as a reward (Bemelmans et al. 1998). Furthermore, the 'leaders' system also requires that once companies were nominated as a leader, they would publicly disclose their emission profiles, strategies, and future directions (AGO 2005). The program thus introduced additional information-based instruments in the interests of 'public disclosure', and by which governments could inform consumers or polluters of the environmental consequences of their activities (IPCC 2007b). This resulted in the GCP Plus comprising: a voluntary instrument (i.e. 'voluntarism'); incentive-based economic instruments (i.e. 'grant' and 'subsidy'), and an information-based instrument (i.e. 'information', 'education' and 'public disclosure').

In terms of instrument design from a theoretical perspective, the GCP, in total, involved a mixed approach with voluntary, incentive-based economic and information-based instruments. Although these incentive-based and information-based instruments seem to be more supportive of the achievement of GHG reduction, the most dominant function of this program was as a voluntary instrument. Thus, this thesis has categorised the instrument design of the GCP according to the criteria for voluntary instruments.

Figure 6.13 below describes the theoretical effectiveness of voluntary instruments against key criteria for achieving a reduction in GHG emissions.

Figure 6.12: Theory based Instrumental Effectiveness for voluntary instruments

Criteria	Voluntary agreements
Environmental Effectiveness	Medium/ Low
Cost-Effectiveness	High
Distributional Equity	Medium/ high
Political Acceptability	Medium/low
Administrative Feasibility	Low

[Adapted from Chapter Three]

Firstly, the criteria show that a voluntary instrument may possess: relatively weak environmental effectiveness, high cost-effectiveness, medium level distributional equity, low-medium level political acceptability, and a low level of administrative feasibility. A later section below will compare the actual effectiveness of this theoretical assessment. This discussion will reveal the relationship between the two and demonstrate the differences between theory and practice, in terms of effective programs for GHG reduction. The following section will consider the actual effectiveness of the GCP.

6.3.4 Actual effectiveness

The following section will analyse the actual effectiveness of the GCP in terms of environmental effectiveness, cost-effectiveness, distributional equity, political acceptability, and administrative feasibility.

6.3.4.1 Environmental Effectiveness (reducing Greenhouse Gases)

According to annual reports 1999-2007[49], the level of program effectiveness of the GCP/ GCP Plus can be assessed by consideration of both the extent of participation between the Commonwealth government and industry and GHG emission reductions in carbon dioxide equivalent[50] per year (CO2-e per year).

Figure 6.14 below presents the extent of participation created by the GCP/GCP Plus between 1998 and 2007. The results show a tendency for participation to increase in the first half of the period but to decrease from the middle to the end. In terms of reaching target levels, the results met the targets in the year 2000 of 500 participants but clearly failed in 2005. In that year there was a target of 1,000 participants, but only around 740 participants was achieved, due to a significant decrease in participation. The GCP therefore failed to make its participation targets over the period.

Figure 6.13: Achievement of targets in the GCP/GCP Plus, 1998-2007: number of participants

Year	Targets for participants	Total number of Participants	Percentage of Participants
1998		224	47%
1999		337	Not indicated
2000	500 agreements by the year 2000	574	Not indicated
2001		773	Not indicated
2002		824	Not indicated
2003		778	Not indicated
2004		more than 770	Not indicated
2005	1,000 agreements by the year 2005	more than 740	Almost 50%
2006		720	Almost 50%
2007		approximately 650	more than 40 %

Adapted from Annual Reports: AGO [Australian Greenhouse Office] 1999b; 2000; 2001; 2002c; 2003b; 2004b; DEH [Department of the Environment and Heritage] 2005; 2006; DEWR [Department of the Environment and Water Resources] 2007; DEWHA [Department of Environment, Water, Heritage, and the Arts] 2008.

Figure 6.15 below describes the progress of GHG emissions abatement by the GCP. The program recognised that emissions abatement was linked to the number of

[49] Annual reports were provided by AGO [Australian Greenhouse Office] 1999; 2000; 2001; 2002; 2003; 2004; DEH [Department of the Environment and Heritage] 2005; 2006; DEWR [Department of the Environment and Water Resources] 2007; DEWHA [Department of Environment, Water, Heritage and the Arts] 2008.

[50] 'Carbon dioxide equivalents: Scientists express the warming potential of various gases in carbon dioxide equivalents. For example over the next 100 years, compared with one kilogram of carbon dioxide released into the atmosphere today, one kilogram of methane will result in about 21 times more warming.' (AGO 2004d p.153).

participants, and thus intended to increase the numbers. However, the results of this study show that most of the annual reports addressing the reduction of GHG emissions in terms of Annual Carbon Equivalent were not available. Thus this study is unable to collect sufficient data to make a precise evaluation of the environmental effectiveness in these critical terms.

Figure 6.14: Achievement of Targets, 1998-2007: reducing growth of emissions (carbon dioxide equivalent per year)

Year	Expected targets for reducing growth of emissions	carbon dioxide equivalent per year (Mt CO2-e per year)
1998		Not indicated
1999		Not indicated
2000	23 Mt of CO2 equivalent by the year 2000	Not indicated
2001		19.2 Mt CO2-e per year
2002		More than 20 Mt CO2-e per year
2003		Not indicated
2004		Not indicated
2005	At least 25 Mt of CO2 equivalent by the year 2005	Not indicated
2006		26 Mt CO2-e per year
2007		Approximately 26 Mt CO2-e per year

Adapted from Annual Reports: AGO [Australian Greenhouse Office] 1999b; 2000; 2001; 2002c; 2003b; 2004b; DEH [Department of the Environment and Heritage] 2005; 2006; DEWR [Department of the Environment and Water Resources] 2007; DEWHA [Department of Environment, Water, Heritage, and the Arts] 2008.

In terms of meeting target levels, the target of 23 Mt CO2-e of GHG emissions for the year 2000 was not met. A 2007 report noted that the program had achieved approximately 26 Mt CO2-e, which met the year 2005 target of reducing the growth of emissions at 25 Mt CO2-e. However, it was not met in time, and data for 2005 was not reported. These results show that the program failed both to increase the number of participants and to meet the targets for reducing GHG emissions as intended. Thus, a determination of environmental effectiveness cannot be made here due to insufficient data. The following section will describe the level of cost effectiveness.

6.3.4.2 Cost Effectiveness

In order to examine the level of cost effectiveness, the study method[51] requires a determination of cost value, which accounts for relationships between a level of achievement in a program and its output costs invested in the program. However, individual output costs for the program were not reported in the program's annual

[51] See the method for determining the effectiveness of 'soft' and 'hard' instruments, described in Chapter Three.

reports. This is because there is a complication with collaborative investing in programs with other programs such as Greenhouse Gas Abatement Program (1997-present). Thus, the analysis failed to identify[52] the level of cost effectiveness of the GCP. The following section will examine the distributional equity.

6.3.4.3 Distributional Equity

The GCP/ GCP Plus primarily focused on cost-effective, flexible, and voluntary based approaches. These programs also provided incentive support and information for the GCP members over time, to encourage more efficient and effective mitigation activities (AGO 1999a; 2005b). This provided equity. Moreover, the primary intention of developing long term sustainable approaches in response to climate change concerns in both of these programs (AGO 1999a; 2005b) suggest that the GCP involved an environmentally sustainable approach. On the other hand, the GCP did not impose any penalties on the members for pollution activities (AGO 1999a), although the Greenhouse GCP Plus considered limited restriction with a mandatory requirement for the large companies' participation in the program (AGO 2005). It can be said that the GCP broadly considered the distributional equity, but promoted relatively little corporate responsibility. The following section will examine political acceptability.

6.3.4.4 Political Acceptability

In terms of making a global contribution, Australia initiated the GCP in response to international obligation requirements from the UNFCCC's (AGO 1999a). On the other hand, the introduction of an Emission Trading Scheme [ETS] was crucial. Whilst implementing the GCP, it was also intended to implement an ETS (AGO 1999a); however, after a consultation period, the government decided not to introduce such a scheme, due to possible impacts on the national economy (AGO 2002A). This suggests a failure in meeting the global challenge to introduce market based pricing carbon. In terms of market ideology, the GCP did not involve any tradable system

[52]Some annual reports have acknowledged the level of cost effectiveness by a different method from the thesis method, e.g. an expression for the program rate of dollar per tonne CO2-e (e.g. AGO 2002c; 2003b).

(AGO 1999a), although some aspects of market classification could exist in the program such as the GCP Plus's 'Greenhouse Friendly' certification and 'Greenhouse Challenge Leaders'[53]. The GCP/ GCP Plus are both of a voluntary nature. They promote a diverse range of actions across a wide range of sectors and organisational sizes and implementation designs (AGO 1999a; 2005b). Industry choices were thus expected to fit different circumstances, with the preferred GCP and GCP Plus approach including inventory information, emissions forecasts, incorporated approaches, and partnerships with industry associations (AGO 1999a; 2005b). These suggest that the program may have been flexible enough to restructure the program's framework. In sum program can be said to have involved various factors of political acceptability.

6.3.4.5 Administrative Feasibility

In terms of administrative and transaction costs, the GCP/ GCP Plus used voluntary approaches to make it cost effective in order to reduce GHG emissions by increasing participation in the agreements (AGO 1999a; 2005b). In terms of enforceability, although the GCP was an entirely non-mandatory initiative, the GCP Plus facilitated limited enforcement for example with a limited restriction with mandatory participation. However, these programs did not provide other penalties such as not-meeting targets, and penalties for pollutants. This suggests that there was weak enforceability in the GCP (DEH 2006; DEQHA 2008). In terms of transparency and credibility, as required under subsection 70(2) of the *Public Service Act 1999*, an annual report[54] was required to be submitted to Parliament towards the end of each year[55] (AGO 1999b). Furthermore, in 1995, industry and government jointly developed an Implementation Plan committed to an evaluation of the program in 1998

[53] 'Greenhouse Friendly' certification: provides a trademark (logo) to market a greenhouse-neutral product or service, which may result in GHG emissions reduction, whilst giving greater and greener purchasing choice (AGO 2005).

[54] Annual reports were provided by AGO [Australian Greenhouse Office] 1999; 2000; 2001; 2002; 2003; 2004; DEH [Department of the Environment and Heritage] 2005; 2006; DEWR [Department of the Environment and Water Resources] 2007; DEWHA [Department of Environment, Water, Heritage, and the Arts] 2008.

[55] An evaluation of the GCP commenced early in 1999 and was expected to report towards the end of the year. The evaluation was a review of the operation and of its financial statements and was overseen by a joint government–industry steering group. It included a major industry survey of Greenhouse Challenge members and non-participants, a data analysis and a comparison of similar international programs (AGO 1999b).

(AGO 1999a). The numbers of progress reports of the Greenhouse Challenge were conducted by government are contained in Fig. 6.16. In March 1999, the *Greenhouse Challenge Evaluation Report* was made publicly available as a response to the Implementation Plan. A further review of the GCP was undertaken in 2003, but not released to the public, with many recommendations said to be already in train (Rae 2004). This lack of data shows that the GCP had little transparency and therefore credibility.

Figure 6.15: Number of progress reports under the GCP by the Government, 1998-2007

	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
Annual report by Australian government	√	√	√	√	√	√	√	√	√	√
Greenhouse Challenge Evaluation Report		√								

Adapted from Annual Reports: AGO [Australian Greenhouse Office] 1999; 2000; 2001; 2002c; 2003; 2004b; DEH [Department of the Environment and Heritage] 2005; 2006; DEWR [Department of the Environment and Water Resources] 2007; DEWHA [Department of Environment, Water, Heritage, and the Arts] 2008, and by *Greenhouse Challenge Evaluation Report* by AGO 1999.

In terms of practicability, although an early report (the 1999 evaluation report) provided some recommendations, the following report in 2003 was not publicly available. In 2004, the GCP Plus came out as an extended program of the GCP. However, this extended program still did not provide an individual evaluation process which was publicly available, even though some reviews of it appeared in government annual reports. This insufficient data makes it impossible to determine the level of practicability. Given these four key aspects: minimising administrative and transaction costs; enforceability; transparency and credibility and practicability, these results failed to determine the program's level of administrative feasibility, due to insufficient data being available.

This section considered instrument effectiveness. The following section will present the *discussion* of the results of the study reflecting on the effectiveness of the GCP as a 'soft' instrument.

6.3.5 Discussion

In discussing the GCP's effectiveness, four perspectives are presented, including: the significance of the GCP, major criticisms of the program, the program's overall effectiveness, and a summary of the effectiveness of the GCP and this study's contribution.

6.3.5.1 Significance of the Greenhouse Challenge/ GCP Plus

The GCP/ GCP Plus was one of the most significant programs in Australia's climate change policy under the Howard Government. This thesis classifies it as a soft policy instrument. The original GCP aimed to reduce GHG emissions by increasing industry participation, and since 2005, GCP Plus largely retained the original structure of the program. In specific terms, the government played a central role in implementation over time, and the basis for the program's approach voluntary without mandatory target settings, penalties for polluter pays, not-meeting targets, and non-compliance. This signifies that the program was likely to provide weak governmental and legislative intervention, in terms of reducing GHG emissions. In practice, a number of critiques about the GCP/ GCP Plus have emerged. The following section will present overview criticisms of the program.

6.3.5.2 Criticisms of the GCP/ GCP Plus

A number of criticisms of the GCP/ GCP Plus have been made. Namely that the program is:

- a 'no regret' voluntary measure with 'business as usual'approach standards creating weak influence on reducing GHG emissions;
- a weak enforcement measure for effecting compliance with agreements, which can not achieve the target level;
- missing a market device, which is a significant tool for reducing GHG emissions;
- lacking transparency and accountability under the program due to the lack of information details by program participants;

- a costly burden lacking financial support;
- lacking implementation progress reports; and
- insufficiently integrated with other stakeholders (such as including environmental NGO for better decision-making).

The following section will discuss both its own findings to date and the relationships between these findings and these criticisms.

6.3.5.3 The Greenhouse Challenge/ GCP Plus Effectiveness

This section will summarise the results from those four elements which comprise the study method, namely the 'descriptive perspective', 'transformative perspective', 'instrument design', and 'actual effectiveness'.

The descriptive perspective described the GCP/ GCP Plus as a soft instrument. The transformative perspective identified trends in the level of instrument use of the program. It showed that use of instrument design remained at the same dominant level over time (i.e. the moderately dominant level). In instrument design, the method found the program contained mixed instruments: a voluntary, incentive-based economic and information-based instrument, despite being defined both as a voluntary and negotiated agreement (AGO 2002b), and as voluntary, economic, and regulatory instruments (AGO 2005). However, it recognised that the voluntary nature of the program dominated. It thus concluded that a theoretical assessment of voluntary instruments would be the most appropriate in estimating the effectiveness of the program. The following criteria characterise voluntary instruments: relatively weak environmental effectiveness, high cost-effectiveness, medium level distributional equity, low-medium level political acceptability, and a low level of administrative feasibility.

The results here could not determine the actual environmental effectiveness of the program due to insufficient data. Limited data showed that it may not meet performance indicator demands. Therefore, the analysis concluded that the program had weak environmental effectiveness in terms of reducing GHG emissions 1997-2007. Bailey (2008) has indicated that there has been a conflict about the level of reduction targets. Australia had a significant increase of net industry and energy emissions by 15% and 31% respectively between 1990 and 2003, with an 8% increase in industrial emissions between 2002 and 2003. In contrast, the AGO reported that the GCP had produced a reduction of more than 21 Mt CO2-e in 2002 compared with business as usual (AGO 2003c). The report also predicted a further annual reduction of 15.8 Mt CO2-e by 2010 (DEH 2005a). However, the 21 Mt CO2-e reported by the AGO falls short of the intended target for 2000, which was 23 Mt CO2-e (See: Figure 6.14).

Moreover, the results also suggest that a predicted annual reduction of 15.8 Mt CO2-e by 2010 is unachievable given that only approximately 6 Mt CO2-e per year was actually achieved between 2002 and 2007, which represents less than 40% of the further predicted target (See: Figure 6.14). Furthermore, in terms of the achievement of target levels, the Senate Environment, Communications, Information Technology and the Arts Committee [SECITAC] (2000) pointed out several criticisms: the early program did not include a clear distinction between emissions reductions from normal business activities and those arising through extra efforts as a result of government investment in industry programs; only a small number of companies met forecast emissions where these were set; and emissions targets and levels of achievement were not addressed in sectoral abatement benchmarks. These criticisms also largely remained in GCP Plus (Taplin 2004; Sullivan 2006; Bailey; 2008). These uncertainties emphasized that the GCP/ GCP Plus had a very weak performance in terms of reducing GHG emissions.

In terms of cost-effectiveness, the analysis here failed to identify the level of cost effectiveness of the program, in the absence of sufficient data. It was expected to be an economically efficient program. It has been argued here that there is limited published data on the costs and benefits of energy or greenhouse expenditures by Australian organisations in the public or private sectors. Owing to such limitations, the GCP/ GCP Plus also provided limited interpretation of the costs and benefits of GHG emissions reduction measures (Sullivan 2006).

The results from distributional equity here showed that the GCP/ GCP Plus, was broadly considered in terms of a variety of incentives and information provision to encourage participants to create more efficient and effective mitigation activities; the primary intention of developing long term sustainable approaches in response to climate change; and no penalties was imposed on the members by pollution activities. However, in practice, the GCP/GCP Plus has been criticized for creating weak incentives for producing more energy efficient products or activities (Hunt 2004; Taplin 2004). Furthermore, a cost burden and insufficient funding support from the federal government were also both critical (CWLTH 2000d). The use of a voluntary approach, in general, could be economically efficient by not measuring and would not pressure participants to take strong risks in economic terms. However, due to the lack of incentive support for the program, the majority of projects being implemented by participants tended to be low-cost projcets or measures, because the incentive support to require a high return on them was lacking (Sullivan 2005b). Such a costly ineffective government program does not encourage the reduction of GHG emissions (Bailey 2008). There is also the issue that the approach aimed to meet demand only for the 'business -as-usual' targets and 'no regret' standards over the long term. These approaches did not provide strong incentives for the program to voluntarily reduce GHG emissions (Sullivan 2006). Given these criticisms, although the analysis here found the program had considered distributional equity, it could also be argued that the lack of incentive support from government based on 'business as usual'targets and 'no regret', in practice, seems to have resulted in the program having little influence on reducing GHG emissions.

The results from the analysis of political acceptability here showed, despite the fact that the flexibility by the voluntary nature of the instrument used could be positive aspect, there were several negative factors involved in the program, namely: failures to meet the global challenge and the market ideology and a failure to implement an emission trading scheme. Regarding the global challenge and market ideology, the program did not articulate with a significant market device such as an emission trading scheme. An ETS would not only create further incentives to support program activities, but would also stimulate participation which may result in reduced GHG emissions (Sullivan 2006). Without such a market device, it can be said that the program has less influence on the political acceptability in terms of reducing GHG emissions (Although a market based system may not be compatible with a program such as the Greenhouse Challenge).

The results from the administrative feasibility analysis here concluded that it was not possible to determine the level of feasibility, due to insufficient data being available. The results found the program had relatively weak enforceability. Without compulsory approaches such as mandatory reporting, setting targets or penalties for activities (i.e. compliance), the program again directly relates to a general failure to reduce GHG emissions (OECD 2001d). In general, the GCP/ GCP Plus included less enforceability, including independent verification reports, non-mandatory participation, and non-penalties for meeting targets and compliance, even though the GCP Plus later included independent verification and limited mandatory participation (by only large emitters). While many of the participants in the program created outcomes such as involvement of members by large emitters, these outcomes would probably have been achieved anyway (Sullivan 2006). Making a balance of enforceability is important in order to ensure levels of compliance and to create mitigating activities. However, the Australian Government did not create binding agreements between the government and industry in the program, because these may have created unacceptable burdens on energy and carbon intensive industries (Bailey 2008). Given these aspects, enforceability seems to be ineffective in achieving reduction in GHG emissions.

Another finding concerning administrative feasibility here was the lack of transparency and credibility, due to a lack of consistent data in evaluation reports. This study concluded that the program was relatively ineffective in this sense. In practice, the lack of transparency and accountability has been criticized. More specifically, the Senate's independent report offered a number of recommendations. Many of these suggestions required that the program should facilitate the reporting of more details concerning company activities, which would then demonstrate the integrity of the GCP members, and inspire public trust (CWLTH 2000d). However, the administration of the GCP/ GCP Plus did not extend to this level of transparency. As a result, it did not either encourage participants to adopt systematic or comprehensive approaches or to provide significant reductions in GHG emissions (ANAO 2004). Bailey (2008) pointed out four further major criticisms, which can be related to lack of transparency and accountability. First, the GCP/ GCP Plus did not require strong consultation for the setting and monitoring of targets between government and emitters. Second, it did not mandate obligations on the participants to submit a report. Thirdly, the program continued its strong emphasis on participants protecting their commercial information, restricting their level of information disclosure and avoiding from reporting all of their evidence. Lastly, the program avoided the consolidation of a strict reporting system, which would have resulted in a negative impact on transaction costs. Considering these aspects, the program cannot be seen to be transparent and credible.

In terms of administrative feasibility, this study failed to determine the level of practicability, in the absence of available data. However, in practice, a number of recommendations were made about the program.

Since the government extended the GCP in 1997, the Australian Senate report *The Heat is On: Australia's Greenhouse Future* in 2000, addressed the lack of transparency and accountability of the program (CWLTH 2000d). The following year, the OECD (2003b) also criticized the insufficient enforcement of target setting, and penalties for not meeting targets and compliance, and for not directly contributing to GHG emissions reduction (OECD 2001d). In 2002, Australia's *Third Communication Report* to the UNFCCC further criticized the program for imposing a costly burden on, and for lack of financial support from, the Commonwealth Government (AGO 2002b). In the same year, the AGO's independent progress report (2002) also indicated the lack of progress reports on implementation and as well as insufficient integration with other agencies such as environmental NGOs (AGO 2002d). In 2004, the ANAO also reported that most of the issues raised in the annual reports were poorly specified and that the description of trends and changes over time was unclear, concluding that there was insufficient reporting processes in place. For instance, reports illustrated results showing a comparison of the level of emission abatement from the GCP/ GCP Plus which confused readers trying to understand actual progress and outcomes (ANAO 2004).

Although the GCP/ GCP Plus later included independent verification and mandatory participation by large emitters, it largely continued the existing approach with a consideration of voluntary approaches (Sullivan 2006). Furthermore, the program retained minimum requirements for agreements, including public disclosure, reporting, and development, and in terms of having limited incorporation and technological assistance (Bailey 2008). These criticisms and recommendations were not acted upon over the life of the program, which signifies that it provided less practicability. In the light of these aspects, namely weak enforceability, the lack of transparency and credibility, and the absence of practicability, it can be said that the level of administrative feasibility in practice, was relatively ineffective in reducing GHG emissions.

Finally, as a result of this study's contribution, 'discussion' summarises the findings of the GCP/ GCP Plus effectiveness in terms of four elements, namely 'descriptive perspective', 'transformative perspective', 'instrument design', and 'actual effectiveness'. In terms of theory, voluntary instruments should have: relatively weak environmental effectiveness, high cost-effectiveness, medium level distributional equity, low-medium level political acceptability, and a low level of administrative feasibility. In respect to these assumptions, although some results in this study showed similar effectiveness as the theoretical assessment, the examination here has failed to clearly determine instrument effectiveness with regard to GHG emission reduction. One major reason was the lack of sufficient data. Partly because of this, it can be concluded that the program had weak environmental effectiveness due to not-meeting its targets; less distributional equity in the absence of a strong incentive support from government based on 'business as usual' targets and 'no regrets'; less influence to the political acceptability due to the failure of global challenge and market ideology; and less administrative feasibility, due to the weak enforceability, transparency and credibility, and the absence of practicability. Although insufficient data was available, some of these results seem to show similar effectiveness as the theoretical assessment.

In summary, the third section of this chapter has presented analysis for examining the effectiveness of the GCP/ GCP Plus, as a soft instrument in Australia's climate change policy regime 1997-2007. The following section will conclude with this chapter.

6.4 Conclusion

This chapter addresses the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions in Australia during 1997-2007.

It has met the primary objective of this chapter, which is to demonstrate Effectiveness Analysis/ Method for identifying the effectiveness of both 'soft' and 'hard' instruments in reducing GHG emissions, in order to fulfil the second aim of this overall thesis to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim of the overall thesis. For the Effectiveness Analysis/ Method, this thesis has demonstrated the application of the SIA for evaluating the effectiveness of the 'soft' and 'hard' instrument activities in the case of Australia's climate policy.

In order to accomplish the primary objective of this current chapter, two case studies are presented. The MRET is a 'hard' instrument and the GCP is a 'soft' instrument. In terms of making an examination of the effectiveness of each program, five aspects by the SIA analysis were used for evaluating the effectiveness of 'soft' and 'hard' instruments. These five aspects were also considered in each case study: a) *descriptive perspective*; b) *transformative perspective*; c) *analysis of instrument design*; d) *evaluation of actual effectiveness*; e) *discussion.*

The results have shown 'hard' instruments were relatively more effective in reducing GHG emissions than 'soft' instruments over the period. In addition, both the MRET and the GCP included a number of elements in their instrument approaches, including government incentives, market devices, and information provisions. However, the study has failed to make a clear distinction in the effectiveness of 'soft' instruments, due to insufficient details available about the GCP in the government reports. The results in this chapter allow this thesis to conduct a further discussion on the relative effectiveness of 'soft' and 'hard' instruments for reducing GHG emissions.

The next Chapter Seven continues the analysis presented in this current chapter and conducts a further discussion on the relative effectiveness of 'soft' and 'hard' instruments for reducing GHG emissions. This examination expands on the findings from the analysis in this current chapter by discussing the results from these five elements of 'soft' and 'hard' instruments in order to determine the relative effectiveness of 'soft' and 'hard' instruments in Australia's climate policy during 1997-2007. It will also present a discussion on the overall importance of the thesis.

Chapter Seven
Discussion

7.0 Introduction

This chapter presents two discussion topics. The first part of this chapter will discuss the effectiveness of 'soft' and 'hard' instruments and conduct a further discussion on the results of analysis of the 'soft' and 'hard' instruments identified in Chapter Six. This discussion addresses the second major aim of this thesis, namely to determine the influence of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed. The second part of this chapter draws together and develops the arguments of main importance to this thesis. These discussion in Chapter Seven leads this thesis to its conclusions.

7.1 Part One: Discussion on 'Soft' versus 'Hard' Climate Policy Instruments

The first part of this chapter discusses the Greenhouse Challenge Program (GCP) as a 'soft' instrument versus the MRET as a 'hard' instrument. This section concludes with a discussion on the relative effectiveness of 'soft' versus 'hard' instruments adopted by of Australia's climate policy between 1997-2007.

In terms of environmental effectiveness, results for the MRET showed that the primary target of an increase of renewable energy sources was successfully met. However, other criticisms demonstrate that, in practice, the program targets were too low and too short term to influence emission abatement (Warwick and Smith 2002; Riedy 2005). These criticisms suggest that an achievement of target level is not only the goal of mitigating activities, the balance of target levels and timelines also needs to be considered. On the other hand, results for the GCP showed a failure to accomplish set targets: i.e. an increase in the number of industries participating, and growth in emission abatement in annual carbon equivalents. Approaches without interventions such as 'legally-binding commitments' and 'enforcement procedures' may not be strong drivers for accomplishing target levels (Hertin et al. 2004). One of the clear distinctions between regulated and nonregulated instruments regarding environmental policy is the level of social and cost pressure on polluters (Macdonald et al 2006). In fact, the clear distinctions between 'soft' and 'hard' instruments in this study[56] are mainly based on government intervention and legal requirements. Given this, in terms of achieving target levels, these results show that 'hard' instruments seem to be more effective in reducing GHGs than 'soft' instruments. Furthermore, it can be said that the failure of 'soft' instruments to meet targets in the cases discussed here was because the instruments were largely dominated by weak legal requirements, and weak government intervention.

In terms of cost effectiveness, the study has revealed that the MRET had a high level of meeting its targets against the cost values expected. However, the complete results from the GCP could not be identified due to the unavailability of cost details in annual reports. This examination has, therefore, failed to establish a comparison of cost effectiveness of a 'soft' versus a 'hard' instrument in these circumstances. Levels of program investment depend on what they intend to, but appropriate levels of cost expenditure toward intended goals also need to be ensured and ascertained (OECD 2004). Although it is important to determine levels of cost expenditure for policy measures, governments often neglect to report on the cost of measures, such as the expected or actual GHG reductions supported by each policy program (UNFCCC 2002). Given this, it can be said that 'hard' instruments may be a better supporter to enable to report a level of cost effectiveness of programs than 'soft' instruments.

As regards to distributional equity, the study found that both the MRET and the GCP had a variety of incentives. However, the GCP seemed to emphasize more cost-effective approaches (i.e. information provision and limited public disclosure) by

[56]This thesis considered distinguished the level of coerciveness between 'soft' and 'hard' instruments, using a number of functional elements for 'soft' and 'hard' instruments are mainly based on government intervention and legal requirements, namely: government intervention; legal requirements, financial penalties, administrative rules; prohibitions; market solutions; specific demands in environmental and climate change policy; and consideration of studies by analysts on the coerciveness of policy instruments.

allowing contracting members to select their most preferred approaches to reducing GHG emissions. Neither programs imposed any penalties for polluting activities on polluters. However, both programs encouraged the development of long term approaches in responding to climate change, which fulfilled the meaning of environmental sustainability. Given this, although the study revealed that both programs involved a number of elements for distributional equity, in practice, the criticism of both programs in terms of their insufficient incentives from the government, means that the influence of 'soft' and 'hard' instruments on distributional equity remains uncertain.

With respect to political acceptability, the study found that the MRET involved a tradable system (i.e. RECs), which was considered a positive influence domestically and internationally in reaching global contributions achieved through the adoption of the market ideology of the tradable system. This tradable system also imposes legislative penalties on retailers for not meeting specific target retailers. On the other hand, the GCP was not accompanied by an emission trading scheme, which would have helped global contributions and market ideology. The examination also identified elements of flexibility in both the MRET and the GCP. The MRET had frequent updates on the eligibility of a range of renewable energy sources and technologies over time; and contained a voluntary domain called 'voluntary surrender', which helped to efficiently update the program. On the other hand, the GCP adopted the voluntary base, giving free choice in terms of approach to participants, including on inventory information, emissions forecasts, incorporated approaches and partnerships with industry associations. Given this, the results seemed to show that the 'hard' instrument could be considered relatively more politically acceptable than the 'soft' instrument, due to a consideration of potentially strong global contributions, market ideology and flexibility. However, in practice, both programs have been criticized for contributing to the dominance of the 'business as usual'approach and for contributing to a weak framework for mitigating activities (ACCI 2003, Greenpeace Australia Pacific 2007, Bailey 2008 and Sullivan 2006; 2008). Based on such a conservative framework for actual emissions abatement, few competitive market opportunities seemed to form in practice, which resulted in weak funding opportunities. It remains uncertain as to whether both programs can be said to have created a minimum influence of political acceptability with such a minimalist and conservative policy framework for reducing GHG emissions.

In terms of administrative feasibility, the MRET was a strong instrument for promoting technological innovation and adaptation. For example, it allowed suppliers to be eligible anytime for the registration of renewable energy generation, to obtain voluntary domains and to avoid any complexity by sharing responsibility amongst stakeholders. These aspects would help overall administrative and transaction costs. On the other hand, the GCP had insufficient data due to limited information in annual reports. Thus administrative and transaction costs cannot be clearly identified in this study. The study further revealed that the MRET involved enforceability; it imposed penalties on participants for non-compliance, and required participants to conduct a regular evaluation on their efforts and progress, which would then be audited by government authorities. Furthermore, the program presented a high level of compliance against the required standards. In the GCP, on the other hand, no level of enforceability was established. Moreover, the analysis here could not determine the level of compliance, due to the unavailability of reporting data from the members and the government. Regarding transparency and credibility, although it has remained uncertain whether the balance of penalty rates was too low or too high for the MRET (Nolles 2006), the results of this study showed that the MRET provided high level reporting performance annually. In contrast, the GCP is distinguished by a lack of transparency and credibility, due to lack of consistent data available in evaluation reports.

As regards the last element for feasibility, this study has also found that the MRET provided a certain level of practicability in that the government recognised and acted upon urgent issues. It has also found that most of the recommendations[57] have been acted upon and amended in legislation. In contrast, in the GCP, a number of suggestions emerged from official or scientific reports, but were not acted upon.

[57] A number of critical recommendations were made by an independent Senate Committee review and Working Group in 2003 (CWLTH 2003). The major issues were as follows: the intention of the Act to accept a national emission trading scheme; changing target parameters of the scheme (i.e. targeting 10% of renewable energy by 2010, increasing the target beyond 2010, and continuing the scheme beyond 2020); and encouraging efforts beyond 'business as usual'(Kant and Mercer 2006). Later, the government acknowledged 30 recommendations from the independent review and agreed with the 14 recommendations (AGO 2004a).

Therefore, it can be said that the 'hard' instrument may be administratively feasible where there are less administrative costs, incentives, market systems, high compliance by participants, and high reporting availability. However, this study was unable to complete an analysis of the relative effectiveness of administrative feasibility of 'soft' versus 'hard' instruments due to insufficient information.

In the light of these findings, it can be concluded that 'hard' instruments seem to achieve their intended targets with potentially more effectiveness than 'soft' instruments. The degree of government intervention and legal requirements[58] may be key drivers toward achieving targets. The 'hard' instrument showed a high level of cost effectiveness. However, the study could not clearly distinguish the level of cost effectiveness of the 'soft' instrument, due to limited evidence. Further, the study revealed that both programs involved a variety of elements for other significant criteria, namely distributional equity, political acceptability and administrative feasibility. However, the study remains unable to make a clear distinction of the relative effectiveness of these aspects of the 'soft' versus the 'hard instruments, due to insufficient information. Following these findings, a number of critical aspects can be further discussed.

First, the study has revealed external influences on the effectiveness of 'soft' and 'hard' instruments by addressing criticisms of the MRET and GCP, such as: political influence on the level of target settings, timelines and penalty rates; and influences of fundamental framework type (i.e. 'business as usual') and the type of institutional frameworks (i.e. ownership by government or industry). The relationship between these criticisms and the results of this study represent a *gap* in the review process undertaken here. This study focused on seeking a clear indication of the 'success or failure' of 'soft' and 'hard' instruments, which this research has, and acknowledges success or failure as one of the most significant aspects in this study. However, in practice, any instrument activities are also related to a variety of influences, including government's 'top-down' and 'bottom-up' approaches, in terms of political,

[58] This thesis has concluded that the level of government intervention is the major elements of classifying whether policy instruments are 'soft' and 'hard'(Chapter Three 3.1.2.2.1). Moreover, one of the clear distinctions between regulated and nonregulated instruments regarding environmental policy is the level of social and cost pressure on polluters (Macdonald et al 2006). Approaches without interventions such as 'legally-binding commitments' and 'enforcement procedures' may not be strong drivers for accomplishing target levels (Hertin et al. 2004).

administrative and institutional influences, and international and domestic influences. Neither is it possible to ignore the influences of other internal and external factors (Hood 1986; Linder and Peters, 1989; De Bruijn and Hufen, 1990; Sinclair 1997; Bemelmans-Videc et al. 1998; Perrels 2001; Annandale et al 2004). The study here is not capable of addressing total effectiveness due to such external factors, but can be used for a basic understanding of the effectiveness of 'soft' and 'hard' instruments. Understanding external influences will further make a clear linkage to the *gap*, which will be a more comprehensive analysis. Furthermore, choices for policy instruments depend on the particular circumstances of a nation such as its political and international relations (Tews et al. 2003) and institutional circumstances (Macdonald et al. 2006). The values and effectiveness of the instrument choices are also differentiated in each nation (Howlett et al. 2003). Given this, it can also be said that the effectiveness of 'soft' and 'hard' instruments is different in different countries, depending on their national circumstances.

The other critical point is that it is generally difficult to analyse the environmental effectiveness of policy instruments because of the unclear definitions of instruments, and the different targets, different data on corporate performance, and issue of mixed instruments (Bailey 2006). Therefore, although this study has concluded that 'hard' instruments seem to perform better in reducing GHG emissions than 'soft' instruments, the use of a 'soft' instrument does not mean total ineffectiveness in environmental outcomes. A good policy also needs to achieve social goals (Bemelmans-Videc et al. 1998). In terms of social improvement such as behavioural change and capacity building for reducing GHG emissions for a long term perspective, it is often required and expected that instruments would go beyond the parameters of governmental control, regulations and public pressure (OECD 2003).

Social approaches can provide better interpretive frames and encourage organisations to acquire the knowledge that leads to better environmental outcomes (Hertin et al 2004). An instrument choice depends on a different focus on the different targets and some GHG mitigation activities do not target direct emission reduction effects but others do, impacts of direct emission reduction should not only become the central solution for reducing GHG emissions, but also targets for indirect reduction for social improvement (EEA, 1996; Aldy et al., 2003; OECD, 2001). However, a rational choice of policy instruments means accomplishing policy goals for a particular issue (Elmore 1987; Salamon et al 1989; Bagchus 1998). In terms of climate change policy, policy instruments able to achieve policy goals have been urgently required to reduce GHG emissions (Stavins 1997; IPCC 2007b; and Okinomous and Jepma 2007). If a program is not carefully assisted by strict monitoring, and reviewing via legislative and regulation for contractual progress towards achieving goals, it will risk being only symbolic policy (Edelman 1964). Furthermore, it is essential that if an instrument is to be truly effective, it will ensure quality of reporting, consistent data provision, precise data illustration against targets, materiality threshold and ideally the provision of a level playing field for all players. The GCP seems to meet nonc of these criteria and thus can be said to act as a symbolic policy (Taplin 2004). From this perspective, 'soft' instruments will likely fail to provide the bottom line of reducing GHG emissions, due to symbolic commitment, insufficient information availability and lack of information consistency.

Given these findings, there is arguably a need for the balance between the degree of power relations between 'soft' and 'hard' instruments in order to choose the most effective instruments for reducing GHG emissions, depending on different policy targets such as *direct* or *indirect* targets. However, policy makers must establish the means for ensuring that each target is met. There is also a need to examine the effectiveness of 'soft' and 'hard' instruments in other countries, because the effectiveness of 'soft' and 'hard' instruments will be different in different countries, depending on their economical, political and institutional circumstances.

The first part of this chapter has presented the second aspect of the case studies by examining the effectiveness of 'soft' and 'hard' instruments and conducting a further discussion on the results from Chapter Six analysis, in order to fulfil the second major aim of this current thesis which is to determine the influence of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim. The following section presents the second part of this chapter, as discussed above.

7.2 Part Two: Discussion of Thesis Arguments

The second part of this chapter aims to draw together and develop the arguments of main importance to this overall thesis in terms of the thesis aims, as outlined in Chapter One. Most of this thesis has treated the methods and case studies independently. The aim of this Chapter, before moving into the final conclusion, is to integrate the methods and case studies into a more inter-linking picture in order to expand the major findings of this thesis.

The Thesis Outline

A key issue for climate change policy, central to the current thesis, is the right choice of policy with the appropriate balance between non-coercive and coercive instruments (i.e. voluntary and regulatory-based instruments). These are referred to as 'soft' and 'hard' instruments[59] in this thesis. Leaders in each country are seeking to make the relevant, right choices at domestic and international levels, and a study such as this thesis presents on 'soft' and 'hard' instruments is necessary for improving these decisions in terms of immediate actions for reduction of GHG emissions. However, there has not yet been a method developed for clearly and simply defining which instruments are 'soft' and 'hard' instruments and their influences. This significant background motivated the primary purpose of this thesis, which is to examine the influence of both 'soft' and 'hard' instruments in terms of reducing GHG emissions.

In order to achieve its purpose, this study has established two inter-related aims. The first aim is to develop methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions, which help distinguishing whether an instrument is 'soft' or 'hard' in terms of evaluating its influence. The second aim is

9[59]All instruments contain a certain level of coerciveness and are based on two individual streams: 'mandated and voluntary' (Hatch 2005). This supports the notion of 'soft' and 'hard' instruments adopted in this study. Each instrument should be positioned based on its level of coercion (i.e. the degree of 'soft' and hard' instruments in this thesis is viewed according to the level of government power and intervention, regulations/ legal binding and penalties).

to determine the influence of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods[60] developed in the first aim.

Figure 7.1: Aims

Primary purpose: to examine the influence of both 'soft' and 'hard' instruments in terms of reducing GHG emissions.
Inter-related aims
i) Developing methods
ii) Applying methods

In terms of developing methods, this thesis has addressed three elements of instrument analysis for identifying the influences of 'soft' and 'hard' instruments in terms of reducing GHG emissions which need to be addressed and developed, namely: (a) the lack of classification of 'soft' and 'hard' instruments; (b) the lack of examination of the trend use of 'soft' and 'hard' instruments; and (c) the lack of examination of the effectiveness of 'soft' versus 'hard' instruments. In considering the three elements which have been addressed in order to develop methods, this thesis has selected two analytical methods for further examination.

The first analytical method was adopted for identifying the trend use of 'soft' and 'hard' climate policy instruments, i.e. developing the first and second elements: (a) the instrument classification and (b) examination of trend use. This method addresses how a nation allocated its adoption of 'soft' and 'hard' instruments over a certain period. The second Identification & Trend Analysis/ Method is for evaluating the effectiveness of 'soft' and 'hard' instruments in climate policy, i.e. supporting the third element: (c) the examination of the effectiveness of 'soft' versus 'hard' instruments. This method addresses the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions.

[60]Two methods were developed in this thesis, namely: (i) Identification & Trend Analysis/ Method for identifying the trend use of 'soft' and 'hard' climate policy instruments; and (ii) Effectiveness Analysis/ Method for evaluating effectiveness of 'soft' and 'hard' instruments in climate policy.

In order to further develop the two analytical methods, this thesis has explored policy instrumentalist theory, and subsequently has focused on approaches to, and critiques of, 'soft' and 'hard' instrumental theory, especially in terms of relevance to climate change policy. After the development of the two methods, this thesis then applied the methods for examining two empirical case studies in order to accomplish the second aim of this thesis (i.e. applying methods).

Figure 7.2: Two Analytical Methods

Identification & Trend Analysis/ Method: to assess how a nation allocated its adoption of 'soft' and 'hard' instruments for reducing GHG emissions over a certain period.

i) Method for identifying the trend use of 'soft' and 'hard' climate policy instruments

Effectiveness Analysis/ Method: to evaluate the actual impacts of the instrument activities on reducing GHG emissions.

ii) Method for evaluating effectiveness of 'soft' and 'hard' instruments in climate policy

In terms of applying the two analytical methods as the second aim, a special focus is placed on Australia's climate policy and upon two policy instruments in particular. This thesis has suggested that there is a compelling need for an evaluation of the effectiveness of 'soft' and 'hard' instruments in Australia's climate policy. One of the major criticisms is whether the national initiatives emphasis upon voluntary-based instruments between 1997-2007 actually encouraged domestic action to reduce GHG emissions (CWLTH 2000; Hon *et al.* 2002; Curran 2003; ANAO 2004; Hunt 2004; Christoff 2005; Sullivan 2007 and Crowley 2007). Thus, an examination of the relationship between the voluntary-based initiatives and the influences of 'soft' & 'hard' instruments is the key issue in the case studies.

Throughout the analysis, two outcomes were expected from the development of the two analytical methods incorporated with their application to Australia's case study, These outcomes address how the government allocated 'soft' and 'hard' instruments, and examine the relative effectiveness of 'soft' versus 'hard' instruments. Findings from the two examinations allow this thesis to answer its primary purpose, which is to examine the influence of both 'soft' and 'hard' instruments in terms of reducing GHG emissions.

In considering its hypothesis, this thesis has argued that the government has tended to use more mixed instruments in its climate policy, resulting in the situation where policy makers cannot easily address or distinguish the absolute power relations/coerciveness between 'soft' and 'hard' instruments. This thesis has also argued that 'soft' instruments largely dominated in Australia's climate policy during 1997-2007, and did not encourage reduction of GHG emissions. The two arguments were thus expected to reflect the findings of this thesis examination.

The following details reflect on the examination of the two analytical methods (Identification & Trend Analysis/ Method and Effectiveness Analysis/ Method) applied in the empirical case study. Each method describes in further detail the *developing methods* and the results from the *applying methods* in order to make a clear linkage of major findings from this study.

Identification & Trend Analysis/ Method: to identify the trend use of 'soft' and 'hard' instruments

In order to assess how a nation allocated its adoption of 'soft' and 'hard' instruments for reducing GHG emissions over a certain period, the method for identifying the trend use of 'soft' and 'hard' climate policy instruments has been further developed. The thesis developed a study of the classification of policy instruments, drawing upon the instrumentation approach: in order to address its aim of evaluating the effectiveness of policy instruments in the field of public policy. In terms of classifying policy instruments, this study has used 'instrumentalism' (Anderson 1977; Stavins 1997; Vedung and van der Doelen 1998; Okinomous and Jepma 2007) incorporated with 'coercive analysis' (Cushman 1941; Anderson1977; Hood 1986; McDonnell and Elmore 1987; Doern and Phidd 1992; Ayers and Braithwaite 1992; Howlett and

Ramesh 1995 ; Gunningham and Grabosky 1998 ; Sullivan and Wyndham 2001 ; Welch and Hibiki 2003 ; and Price 2005).

In terms of developing the method, this thesis addressed two key aspects, namely: classifying policy instruments and distinguishing 'soft' and 'hard' instruments. In a study of instrumentalism, Anderson acknowledges that identifying characteristics of policy instruments is essential in terms of understanding the abilities and limitations of government resources (1977). Categorising instruments means identifying resources that governments can use to achieve their policy goals, which is very important when analysing a government policy approach (Bemelmans-Videc et al. 1998). In terms of categorising instruments, policy actors need to select instrument categories depending on particular policy objectives (Stavins 1997). Thus categorising policy instruments is essential in terms of analysis here. However, such categorisation is useful in identifying general trend use in climate change policy but is not sensitive to levels of coerciveness between instruments in policy programs, which is an important factor to consider when looking to analyse policy use and effectiveness of both 'soft' and 'hard' instruments.

This thesis then further explored key analytical elements from the historical context of 'coercive analysis'/ 'degree of coercion' and 'instrument categorisation' including the field of public policy, environmental policy and climate change policy (Cushman 1941; Anderson 1977; Hood 1986; McDonnell and Elmore 1987; Schneider and Ingram 1990; Doern and Phidd 1992; Braithwaite 1992; Howlett and Ramesh 1995; Gunningham and Grabosky 1998; Welch and Hibiki 2003; Price 2005; Sullivan and Wyndham 2001). However, a clear means of illustrating how to distinguish whether an instrument is 'soft' or 'hard' was not established by this literature. Thus there is a critical question: how to develop a simple and clear method of identifying how 'soft' and 'hard' instruments can be classified. The key criticism is that illustrating the relations between 'soft' and 'hard' instruments including policy influences and outcomes, tends to lead to uncertainty, especially where mixed instruments are applied. This is because regulatory or voluntary instruments generally do not exist individually in a given context and are usually combined with a variety of other instruments, which again will depend on policy targets (Sullivan and Wyndham 2001). This circumstance also becomes more common in environmental policy, where complex instrument designs are demanded to mirror complex issues at local and global levels.

These difficulties led this thesis to reflect on the ideology of the level of power relations/ coerciveness between 'soft' and 'hard' instruments in the historical policy context. The study has addressed a number of key elements dominating in the ideology, which can be defined as: the level of governmental power and government intervention in terms of a particular policy target. From these key elements, this thesis attempted to distinguish the level of instrumental coerciveness by examining key measurable criteria from several perspectives through government intervention; environmental and climate change policy; and consideration of studies by other analysts on the instruments' power relations, in order to devise a simple and clear method of identifying whether an instrument is 'soft' or 'hard'.

Given this background, in terms of developing the method for identifying the trend use of 'soft' and 'hard' climate policy instruments, this thesis has adapted two approaches here, namely: i) Classification of Climate Policy Instrument Categories; and ii) Determination between 'Soft' and 'Hard' Climate Instruments. The detail of these approaches is further described below.

Figure 7.3: Identification & Trend Analysis/ Method: to identify the trend use of policy instruments

i) Method for identifying the trend use of 'soft' and 'hard' climate policy instruments

a) Classification of Climate Policy Instrument Categories [CCPIC]; and
b) Determination of 'Soft' and 'Hard' Climate Instruments [DSHCI].

a) Classification of Climate Policy Instrument Categories [CCPIC]

In terms of classifying policy instruments, the CCPIC approach developed in this thesis has included six instrument categories [regulatory, voluntary/voluntary agreement, economic, research, information-based and mixed instruments]. There are two reasons for this determination. These six classifications were adopted as those used in the Australian national reports to the United Nations in 2002 and 2005 (AGO 2002 and 2005). These classifications also avoid overcomplication. Kirschen et al. (1964) suggest that too much classification merely provides a more precise categorisation. These classifications are useful in identifying the general trend use in climate change policy but are not sensitive to levels of government coercion and other significant features in policy programs, which are important to consider when looking to analyse policy use and effectiveness. Thus, the following DSHCI approach helps this study to determine the level of coerciveness between 'soft' and 'hard' instruments.

b) Determination of 'Soft' and 'Hard' Climate Instruments [DSHCI]

In terms of distinguishing between 'soft' and 'hard' instruments in climate policy, the thesis has developed the DSHCI approach with 17 criteria[61], which focuses on the level of instrument dominances with key criteria to classify the 'soft' and 'hard' instrument designs of a national government in terms of reducing GHG emissions. The criteria also help policy makers appreciate which levels of coerciveness of policy instruments were employed by government initiatives. This thesis considered distinguishing the level of coerciveness between 'soft' and 'hard' instruments, using a number of functional elements for 'soft' and 'hard' instruments, namely: government intervention; legal requirements, financial penalties, administrative rules; prohibitions; market solutions; specific demands in environmental and climate change policy; and consideration of studies by analysts on the coerciveness of policy instruments. This approach then considered the four levels established in each criteria, used for determining whether instruments are 'soft' or 'hard', namely: *least dominant*, *moderately dominant*, *highly dominant* and *most dominant*. This measurement scale was devised to allow for a simple and clear classification of the level of coercion between 'soft' and 'hard' instruments.

[61]The 17 Criteria include: Information Provision, Educational Support by Government, Incentives and Subsidies by Government, Specific and Measurable Emission Reduction Targets in a program, Timeframe in a program, Guidance or Guidelines for implementation, Monitoring, Reporting and Certification, Auditing, Reviewing and Certification, Public Disclosure, Committed Contractual Improvement, Any Market Device or creation of competitiveness, Government Regulation for Standards, Government Penalty of Polluter Pays, Government Penalty for Nonparticipation, Government Penalty for Noncompliance, Government Penalty for Failure to Meet Targets.

The method for identifying the trend use of 'soft' and 'hard' climate policy instruments therefore comprises two approaches, namely: CCPIC and DSHCI, and was then applied in the empirical case studies.

Chapter Five applies the methods for the trend use of 'soft' and 'hard' instruments (i.e. CCPIC and DSHCI approaches) and examines analysis of its empirical case studies. This chapter considered three themes: a) the types of policy instruments utilised by the Australian government during the period 1997-2007; b) how such instruments varied according to the criteria developed in this thesis for assessing 'hard' and 'soft' policy instruments; and c) what the trend usage of such instruments was over time.

In terms of the types of policy instruments utilised by the Australian government, results obtained by the CCPIC approach explain what sorts of instruments were used under the policy. The results clarify that the large numbers of policy instruments that were used during the period were mixed instruments and that the analysis of the six instrument categories was able to illustrate types of instruments but not their level of coerciveness (i.e. 'soft' and 'hard'). The case studies also confirmed that the government uses more mixed instruments in climate policy, showing that policy makers cannot easily recognise which instruments are 'soft' or 'hard' in terms of clear instrument characteristics and their effectiveness, which has satisfied one of the thesis arguments[62]. In other words, it can be said that policy makers can fail to recognise that voluntary measures are not always applied as 'soft' instruments, and that regulations are not always applied as 'hard' instruments, depending on the degree of power relations/ coerciveness particularly in terms of: government intervention, regulation/legal bindings, and penalties.

Following the results, this analysis further identifies whether instruments are 'soft' or 'hard' instruments in climate policy and examines their trend use. Trend use refers in this thesis to assess how a nation allocated its adoption of 'soft' and 'hard' instruments for reducing GHG emissions over a certain period. Results obtained by the DSHCI method show the Australian national initiatives during the period were

[62] This thesis has argued that the government uses more mixed instruments in climate policy and policy makers cannot easily address the absolute power relations/coerciveness between 'soft' and 'hard' instruments.

largely reliant on relatively 'soft' instruments, showing a tendency to increase the use of softer instruments over time. The results have satisfied the thesis argument[63] that 'soft' instruments largely dominated in climate policy. The results clarify that national initiatives with the voluntary-based instruments were largely dominated by 'soft' instruments. Moreover, the results also show that most of the instruments used in this period were also designed without strong incorporation with government intervention, regulation/legal binding or penalties. Moreover, there was a strong preference by government to focus on incentive-based, information-based and auditing based approaches (i.e. information, education, incentives, guidelines and auditing).

These findings of the CCPIC and DSHCI approaches have clarified the trend use of 'soft' and 'hard' instruments in a climate change policy, and have also allowed this thesis to classify whether a program was 'soft' or 'hard' in order to be able to select particular case studies, examining both 'soft' and 'hard' instruments. The following section presents outcomes in the Effectiveness Analysis/ Method, which is to evaluate the effectiveness of 'soft' and 'hard' instruments in terms of reducing GHG emissions.

[63] This thesis has argued that 'soft' instruments largely dominated in Australia's climate policy during 1997-2007.

Effectiveness Analysis/ Method: to evaluate the effectiveness of 'soft' and 'hard' instruments

In order to evaluate the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions, the method for evaluating effectiveness of 'soft' and 'hard' instruments in climate policy has been developed. The idea was derived largely from the ideas of Hood (2007) and Lascoumes and Le Gales (2007).

The study of developing an analysis for 'soft' and 'hard' climate policy instruments in this thesis is intended to develop a simple and basic instrument analysis. Hood suggests that every instrumentation approach is related to a 'generic approach'. This generic approach aims to consider the roots of instrumentation management with what are the most basic and key elements of instrumentation analysis (2007). Instrument analysis itself is always a central issue in public policy. However, the study of instrumentation needs to be developed in terms of what the fundamental components demand for instrumentation analysis, in order to interpret policy behaviour (Hood 2007; and Lascoumes and Le Gales 2007). The main analytic approach adopted is derived from the thinking of Lascoumes and Le Gales (2007), who acknowledge five fundamental approaches that exist as the basis of instrumentation study: a) focusing on instrument analysis is a central issue in public policy and represents political behaviour over a certain period; b) analysing relevant instrument choice is critical for meeting policy objectives; c) evaluating the effectiveness of instruments is also a key concern; d) seeking innovative, effective, instruments applicable to particular policy development is a central aim; and e) focusing on the influences of instruments for a particular policy network is a worthwhile effort. This thesis has adopted these five fundamental instrumental approaches as its main analytic approach. Meanwhile, Hood also suggests that the generic approach should consider different principles for different policy purposes (2007). This thesis has then considered principles in terms of the most appropriate instrument analysis of climate policy.

Two key principles have been adapted here in terms of climate policy instrument analysis. The first principle is *priorities*, whereby policy makers need to identify specific priorities in the field of policy (Hood 2007), in order to ensure the most appropriate instruments are chosen for climate change policy for the best emission reduction achievement (SYKE et al. 2007). This thesis has elaborated and adapted four such *priorities* namely: *instrument design, successful GHG mitigation, program achievement* and *economic efficiency*. These priorities help to analyse climate policy instrument design. The second principle is *criteria* to determine which evaluative criteria are the most suitable for application to environmental policy, in particular to climate change policy (IPCC 2007b). This thesis has again selected four criteria, namely: *effectiveness for reducing GHGs*, *cost effectiveness*, *administrative feasibility* and *political acceptability*. Each criterion measures a different aspect of climate change policy, and is required in order to achieve successful GHG mitigation.

These theoretical thoughts regarding methodology and the two principles above (*priorities and criteria*), have led here to the establishment of the most relevant approach to methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions. This thesis has furthermore synthesised a variety of key aspects into five analytical perspectives: Synthesised Instrument Analysis [SIA] in considering these theoretical thoughts. The following section describes further detail of SIA.

Figure 7.4: Effectiveness Analysis/ Method: to evaluate the effectiveness of 'soft' and 'hard' instrument activities on reducing GHG emissions

ii) Method for evaluating effectiveness of 'soft' and 'hard' instruments in climate policy

Synthesised Instrument Analysis [SIA]

a) *Descriptive perspective*
b) *Transformative perspective*
c) *Analysis of instrument design*
d) *Evaluation of actual effectiveness*
e) *Discussion*

Synthesised Instrument Analysis [SIA]

The refined method, SIA, is fundamental in determining the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions during a particular period. SIA has considered the three key issues from the theoretical thoughts discussed above, namely: a need for simple and fundamental instrumentation analysis; a need for identifying specific priorities of instrument analysis in terms of climate policy for the best emission reduction achievement; and a demand for finding the most suitable evaluative criteria for application to climate policy. In considering these theoretical thoughts, the SIA has developed five analytical phases, namely: *Descriptive perspective*; *Transformative perspective*; *Analysis of instrument design*; *Evaluation of actual effectiveness*; and *Discussion.*

Each phase evaluates a different aspect of influence of a particular policy instrument in order to achieve successful GHG mitigation. The *Descriptive perspective* is the first stage of the method aims and describes the background of a case study evaluating the effectiveness of 'soft' and 'hard' instruments. The *Transformative perspective* is the second stage and illustrates trend use of policy instruments for case studies. The *Analysis of instrument design* is the third stage, which examines theoretical instrument analysis for the instrument design in terms of GHG emission reduction. The *Evaluation of actual effectiveness* is the fourth stage and aims to examine the effectiveness of 'soft' and 'hard' instruments in climate change policy. The *Discussion* is the fifth stage and aims at reflecting on all the results from each stage of the instrument analysis (See Chapter Three). The SIA has thus been developed in this thesis, as a simple but fundamental and relevant method, in order to evaluate the effectiveness of the 'soft' and 'hard' instruments.

Chapter Six has demonstrated the application of the SIA method for evaluating the effectiveness of the 'soft' and 'hard' instrument activities in the case of Australia's climate policy. First, two case studies were selected from the results in Chapter Five: The MRET is identified as a 'hard' instrument and the Greenhouse Challenge Program as a 'soft' instrument. This thesis has examined these two case studies as the most relevant to its analysis. This thesis has then applied the SIA method to the case studies. The results from the SIA in this chapter also allowed this thesis to conduct a further discussion (Chapter Seven) on the determination of the relative effectiveness of 'soft' and 'hard' instruments in the case of Australia's climate policy.

Both programs: the MRET and GCP were well known major initiatives for reducing GHG emissions in Australia's climate policy during 1997-2007. In 2001, the then Prime Minister, John Howard, introduced the MRET, the only regulated program entirely mandated by federal initiatives during the Howard regime to increase the functions of renewable energy sources in Australia's electricity (AGO 2003c). On the other hand, the GCP was an entirely voluntary measure. The original GCP was an extension by the Howard Government of an initial voluntary program instigated by the Labor Prime Minister, Paul Keating (AGO 2005). The program was intended to increase the number of voluntary agreements between government and industry (CWLTH 1997). In 2004 the Prime Minister announced the GCP Plus, which updated the existing GCP to integrate with other existing programs, such as the Generator Efficiency Standard (GES) and the Greenhouse Friendly Program to reduce GHG emissions (DHH 2006). Although the framework of the GCP Plus was slightly changed (DEH 2006), it largely continued the original voluntary approach (AGO 2005). Therefore, during the period, both programs were expected to be the most important instruments in terms of national initiatives, and expected to result in a strong contribution to the reduction of GHG emissions over the long term. Whilst one program was an entirely mandatory framework as a 'hard' instrument, the other was intended to be a completely voluntary framework, as a 'soft' instrument. It is therefore appropriate to determine the relative effectiveness of these 'soft' and 'hard' instruments in reducing GHG emissions.

The analysis concludes that although the overall emission trends show that Australia increased emissions over time, the few 'hard' instruments employed were relatively more effective than 'soft' instruments in reducing GHG emissions in the country. However, it failed to make a clear distinction in the relative effectiveness of 'soft' versus 'hard' instruments, due to insufficient details available about the GCP in government reports over the period. In specific terms, in relation to analysing the 'success and failure' of 'soft' and 'hard' instruments, the 'hard' instrument considered constantly met its intended targets over time, whereas the 'soft' instrument failed to meet its targets. Furthermore, the 'hard' instrument showed at high level of cost effectiveness. However, the study could not clearly distinguish the level of cost effectiveness of the 'soft' instrument due to limited evidence. Moreover, the study revealed that both programs involved a variety of elements in terms of other significant criteria, namely distributional equity, political acceptability and administrative feasibility. However, the study remains unable to make a clear distinction of the relative effectiveness of these aspects of the 'soft' versus the 'hard instruments, due to insufficient information being available from government.

Overall, however, it can be concluded that the key policy design based on voluntary-based instruments during 1997-2007 did not encourage a significant reduction of GHG emissions, which confirms the thesis argument[64].

The study also concluded that 'soft' instruments have fundamentally failed at a basic level to provide the desired outcomes of reducing GHG emissions, because they tended to be symbolic policies, which gave insufficient information and lacked information consistency, in comparison to 'hard' instruments. Furthermore, the study finds that the SIA is not capable of addressing total effectiveness in terms of a variety of external factors such as government's 'top-down' and 'bottom-top' implementation approaches, as well as political, administrative and institutional influences, and international and domestic influences. However, the methods can be used to illustrate the fundamental idea of the effectiveness of 'soft' and 'hard' instruments. More broadly, thus the understandings of the effectiveness by the SIA used in this thesis and other external factors will make a more comprehensive analysis. And in order to more broadly apply SIA analysis, there would also be a need to examine other countries. The effectiveness of 'soft' and 'hard' instruments may well be different in different countries. Although the UNFCCC secretariat broadly reviews policy instruments used in contracting countries, the comparison of the effectiveness of 'soft' and 'hard' instruments among different states and countries using the analysis proposed here, would also contribute significantly to understanding the ability of 'soft' and 'hard' instruments to reduce GHG emissions of each country, with particular significance in carbon intensive countries.

This section has drawn together and developed the arguments of main importance to this overall thesis, in terms of the aims outlined in Chapter One. The primary purpose of this thesis is to examine the influence of both 'soft' and 'hard' instruments in terms of reducing GHG emissions. The outcomes of the two inter-related aims, developing methods (namely Identification & Trend Analysis/ Method and Effectiveness

[64] This thesis has argued that Australia's climate policy during 1997-2007 did not encourage reduction of GHG emissions.

Analysis/ Method and applying these methods in the case of Austria's climate policy, have been described in this section. The outcomes described here show a clear inter-linking picture of the major findings of this thesis.

The results from the analyses conclude that large numbers of policy programs used during the 1997-2007 period were mixed instruments, which clarifies that the government uses more mixed instruments in Australia's climate policy. This has meant that policy makers are not easily able to recognise which instruments are 'soft' or 'hard' in terms of clear instrument characteristics and their effectiveness. The national initiatives with the voluntary-based instruments were also largely dominated by 'soft' instruments, and showed a tendency to increase the use of softer instruments over time. Furthermore, although the overall emission trends showed the country increased emissions over this time, the few 'hard' instruments employed were relatively more effective than 'soft' instruments in reducing GHG emissions in the country. Given this, it can be concluded that Australia's climate policy design based on voluntary-based instruments was largely reliant on 'soft' instruments during 1997-2007 and did not encourage a significant reduction of GHG emissions.

These outcomes allow this thesis to achieve its primary purpose, which is to examine the influence of both 'soft' and 'hard' instruments in terms of reducing GHG emissions. The following section presents the conclusions of this chapter.

7.3 Conclusion

This chapter has conducted two discussions. The first part of this chapter continued to discuss the results of the analysis of the 'soft' and 'hard' instruments identified in Chapter Six. The discussion in the first part of this chapter has fulfilled the second major aim of this current thesis, namely to determine the influence of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed.

The discussion in the first part concludes that 'hard' instruments were relatively more effective in reducing GHG emissions than 'soft' instruments in the case of Australia's Climate policy during 1997-2007, although the study has failed to make a clear distinction between the relative effectiveness of 'soft' versus 'hard' instruments, due to insufficient details available about the GCP in the government reports over the period. In specific terms, in relation to analysing the 'success and failure' of 'soft' and 'hard' instruments, the 'hard' instrument met its intended if modest targets over time, but the 'soft' instrument failed to meet its targets. The study also concluded that 'soft' instruments have failed at a fundamental level to provide the desired outcomes of policy initiatives towards reducing GHG emissions, because they tended to be symbolic policies, which gave insufficient information and lacked information consistency, in comparison to 'hard' instruments. However, the influence of 'soft' and 'hard' instruments on reducing GHG emissions can be different in different countries, depending on their economic, political and institutional circumstances. Furthermore, there is a need for the balance of the degree of instrumental coerciveness between 'soft' and 'hard' instruments in order to choose the most effective instruments for reducing GHG emissions, depending on different policy targets such as *direct* or *indirect* targets to reducing GHG emissions.

The second part of this chapter has drawn together and developed the arguments of main importance to this overall thesis, especially of the thesis aims. In each aspect, this section has demonstrated the discussions amongst the main arguments, responding to their arguments and contributions. These discussions in this chapter are very important to lead this thesis to its conclusions.

Chapter Eight concludes the thesis presentation.

Chapter Eight

Conclusions

This chapter concludes this thesis. It will present a summary description of the background, significance and major purpose of this study. It will summarise findings of each chapter and shall also reach some broader conclusions about the influence of 'soft' and 'hard' climate policy instruments.

A key issue for climate change policy, central to this thesis, is the right choice of policy with the appropriate balance between non-coercive and coercive instruments (i.e. voluntary and regulatory-based instruments). These are referred to as 'soft' and 'hard' instruments in this thesis. However, there has not yet been a method developed for simply defining the influences of 'soft' and 'hard' instruments in terms of reducing GHG emissions. Leaders in each country are seeking to make the right choices at domestic and international levels, and a study such as this thesis presents on 'soft' and 'hard' instruments is critical to improving these decisions. Nowhere is this more evident than in the case of Australia.

A study on Australia's climate change policy during 1997-2007 is critical, the country being one of the most carbon intensive countries in the world. When the rest of the world was demanding strong initiatives from developed nations in terms of immediately implementing actions to reduce greenhouse gases, Australia, during the period, was taking predominantly voluntary action. There is a need for examining the effectiveness of how the 'soft' and 'hard' instruments adopted by the government influenced reduction of GHGs during the period, and for analysing whether the voluntary based actions encourage mitigation activities.

Given this background, three significant issues were considered, namely: a) the further development of the relevant field of public policy; b) analysis of climate change policy instruments; and c) the study of countries which must consider the reduction of GHG emissions.

This study firstly contributes to further development of this field of public policy, especially with its examination of coerciveness in policy instruments. As described in Chapter One, there is a need to develop methods to classify the degree of 'softness' and 'hardness' of instruments in the study of policy instruments, and in terms of the illustration of their effectiveness in order to examine the influences of both 'soft' and 'hard' instruments in terms of reducing GHG emissions. This is because there had been neglect by researchers of recognition of the actual class of coerciveness[65] between 'soft' and 'hard' instruments. This better recognition enables policy makers to classify various policies and their impacts (Okinomous and Jepma 2007) and to determine the actual class of coerciveness (i.e. policy relations are also referred in this thesis) and to clearly interpret its effectiveness (Macdonald 2001). However, causality between policies and outcomes is unclear, in particular, where mixed or various instruments are applied in order to achieve policy goals (Sullivan and Wyndham 2001). Too much focus on mixed instruments (more than one instrument combined) also results in complicated combinations and difficulty in classification (Okinomous and Jepma 2007), since 'optimal mix': right combination of instruments makes a better policy outcome (Howlett 2004) as effective policy instrument design has become an accepted idea in common thinking (Van Nispen and Ringeling 1998; Gunningham, Grabosky, and Sinclair 1998; and Howlett 2003, 2004). When analysing instrument mixes, researchers have also neglected the actual class of coerciveness or the degree of regulation in the shift between 'soft' and 'hard' instruments. Therefore, there is a need for further development of methods to classify the degree of 'softness' and 'hardness' of instruments in the study of policy instruments and the illustration of their effectiveness, which this study has undertaken.

The second contribution of this study is to develop ideas for climate policy analysis. An understanding of 'soft' and 'hard' instruments represents a manner of appreciating governmental control by instrument choice (Hatch 2005). The balance of power between coercive and non-coercive instrument type is essential in terms of reducing GHG emissions (Edenhofer et al. 2009). A clear identification of the influences of 'soft' and 'hard' instruments thus helps to address the extent of governmental control

[65] The actual class of instrument coerciveness/ power relations is regarded as the level of social control exerted by an instrument adopted by governments, which is intended to achieve a particular policy goal in this thesis.

during a certain period of time, and to identify weaknesses and strengths of instrument design by government in terms of urgent action in order to reduce GHG emissions. The results of considering the significance of this study for instrument analysis theory also allows policy makers to develop ideas for further discussion about the most appropriate climate change policy.

The third significance of this study is to offer a contribution to countries which must consider the reduction of GHG emissions. In terms of identifying the influence of 'soft' and 'hard' instruments in the reduction of GHG emissions, an examination of Australia's climate policy is critical to policy development elsewhere. The domestic climate policy of this Australian era concerns one of the most carbon intensive developed countries, which must consider a significant reduction in GHG emissions, and be responsible for leading a strong global initiative. However, Australia has chosen a largely voluntary pathway when much of the world was demanding strong initiatives from developed nations in terms of immediately implementing actions to reduce GHGs. There is a need for revealing whether the policy reliant upon voluntary based actions encourages a significant enough reduction of GHG emissions. This thesis is the first study to explore the design and effectiveness of 'soft' and 'hard' instruments in Australia, but can also generate results applicable to other countries, in terms of developing methods for identifying the influence of 'soft' and 'hard' instruments in the reduction of GHG emissions. Therefore, this study does not only help better instrument choices for the future in Australia, but also future instrument choices of other carbon intensive countries.

These three significant issues were thus developed throughout this thesis. Given this background and significance, this thesis established a primary purpose. The primary purpose of this thesis was to examine the influences of both 'soft' and 'hard' climate policy instruments, especially in reducing GHG emissions. The thesis has established two inter-related aims. The first was to develop analytical methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions. In doing so, it aimed to clarify which aspects of these methods should be addressed in order to examine influence in the context of climate policy and how the methods can be developed by the most relevant disciplines in terms of reducing GHG emissions. The second aim was to determine the influences of 'soft' and 'hard' instruments by applying the methods developed in the first aim. In order to achieve this objective, a special focus was placed on Australia's climate policy from 1997 to 2007, which was developed under the Howard Government

This thesis has argued that the government has tended to use more mixed instruments in climate policy, and that policy makers cannot easily address the absolute power relations/coerciveness between 'soft' and 'hard' instruments. Here, power relations/ coerciveness refers to the level of social control by instrument uses by governments in terms of climate policy. The results clarify that the large numbers of policy instruments used during the period were predominantly mixed instruments. It established that policy makers can fail to recognise that voluntary measures are not always applied as entirely 'soft' instruments, and that regulations are not always applied as entirely 'hard' instruments, depending on the relative dominance of elements of instrument coerciveness namely: government intervention, regulation/legal bindings, and penalties.

This thesis has also argued that 'soft' instruments largely dominated Australia's climate policy during 1997-2007, and did not encourage any meaning for reduction of GHG emissions. The analysis has demonstrated that the Australian national initiatives on the climate policy during the period 1997-2007 were largely reliant on relatively 'soft' instruments, indeed showing a tendency to increase the use of softer instruments over time. Most of the instruments used in this period were also designed without strong incorporation with government intervention, regulation and penalties. Moreover, there was a strong preference by government for focusing on incentive-based, information-based and auditing based approaches (i.e. information, education, incentives, guidelines and auditing). In terms of the effectiveness of instruments, although the overall emission trends showed the country increased emissions over this time, it was established that the few 'hard' instruments employed were relatively more effective than 'soft' instruments in reducing GHG emissions in the country. This research also shows that policy designed on voluntary-based instruments during 1997-2007 did not encourage a significant reduction of GHG emissions.

To assist in analysing the influences of both 'soft' and 'hard' instruments in climate policy, this thesis has focused on the policy instrumentalist literature in order to achieve its first aim of developing reluctant methodological approaches derived from the public policy literature. The policy instrumentalist literature has been used to provide frameworks to create the most suitable approach for the policy instrumentalist analysis.

Chapters Two and Three fulfil the first aim of this thesis, which was to develop analytical methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions. This thesis firstly addressed three elements of methods for identifying the influences of 'soft' and 'hard' instruments which need to be developed, namely (i) overcoming the lack of classification of 'soft' and 'hard' instruments; (ii) overcoming the lack of examination of the trend use of 'soft' and 'hard' instruments; and (iii) overcoming the lack of examination of the effectiveness of 'soft' versus 'hard' instruments. In considering the three elements which have been addressed in order to develop methods, this thesis has selected two analytical methods for further examination.

The Identification & Trend Analysis/ Method was adopted for identifying the trend use of 'soft' and 'hard' climate policy instruments, which addresses how a nation allocated its adoption of 'soft' and 'hard' instruments over a certain period. The Effectiveness Analysis/ Identification & Trend Analysis/ Method is for evaluating the effectiveness of 'soft' and 'hard' instruments in climate policy, which addresses the actual impacts of both instrument activities on reducing GHG emissions.

In terms of developing the Identification & Trend Analysis/ Method, this was derived from the instrumentalist approach using 'instrumentalism' incorporated with 'coercive analyses'. This thesis established two key analytic aspects, namely: classifying climate policy instruments and distinguishing 'soft' and 'hard' instruments. This thesis has devised two approaches here, namely: i) Classification of Climate Policy Instrument Categories [CCPIC]; and ii) Determination of 'Soft' and 'Hard' Climate Instruments [DSHCI], in terms of developing its method for identifying the trend use of 'soft' and 'hard' climate policy instruments,

The CCPIC approach developed in this thesis, in terms of classifying policy instruments, has included six instrument categories [regulatory, voluntary/voluntary agreement, economic, research, information-based and mixed instruments]. These are useful in identifying the general trend use in climate change policy but are not sensitive to levels of government coercion in policy programs, which it was argued an important factor to consider when looking to analyse policy use and effectiveness.

With regard to distinguishing between 'soft' and 'hard' instruments in climate policy, the thesis has also developed the DSHCI approach with 17 criteria, which focus on the level of instrument dominances with the number of key criteria to classify the 'soft' and 'hard' instrument designs of a national government. This approach also indicated four levels established in the criteria, used for determining whether instruments were 'soft' or 'hard', and these were: *least dominant*, *moderately dominant*, *highly dominant* and *most dominant*. This measurement allows policy makers to determine a simple and clear classification of the level of coercion between 'soft' and 'hard' instruments. The Identification & Trend Analysis/ Method for identifying the trend use of 'soft' and 'hard' climate policy instruments developed in this thesis therefore comprises two approaches, namely: CCPIC and DSHCI.

In terms of examining the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions, the Effectiveness Analysis/ Method has been used to examine the effectiveness of 'soft' versus 'hard' instruments in the policy. The main analytic approach developed in this thesis was selected to use a fundamental approach[66] derived from the thinking of Lascoumes and Le Gales (2007). Two principles have been considered as principles for the policy analysis. The first principle is *priorities*, which policy makers need to identify specific priorities of the field of policy (Hood 2007), in order to ensure the most appropriate instruments for climate change policy for the best emission reduction achievement (SYKE et al. 2007). This thesis has adopted four *priorities* namely: *instrument design, successful GHG mitigation, program achievement* and *economic efficiency*. These priorities help to analyse instrument design. The second principle is *criteria* to determine which evaluative criteria are the most suitable for application to environmental policy, in

[66] fundamental approach from the theoretical ideas of Lascoumes and Le Gales (2007), namely: a) focusing on instrument analysis is a central issue in public policy and represents its particular political behaviour for a certain period; b) analysing relevant instrument choice for meeting the policy objectives sets; c) evaluating effectiveness of instruments; d) seeking innovative, effective, instruments applicable to particular policy development; and e) focusing on discussing influences of instruments for a particular policy network.

particular to climate change policy (IPCC 2007). This thesis has selected four criteria, namely: *effectiveness for reducing GHGs*, *cost effectiveness*, *administrative feasibility* and *political acceptability*. Each criterion measures a different aspect of climate change policy, and which is required, it is argued here, in order to achieve successful GHG mitigation.

These theoretical thoughts regarding the fundamental approach and the two principles of a climate policy instrument analysis (*priorities and criteria*), have led this thesis to establish an approach to answer the question of the methods of which are best for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions. Finally, the thesis has synthesised a variety of key aspects into five analytical phases: Synthesised Instrument Analysis [SIA] in considering these theoretical thoughts. The five phases are, namely: *descriptive perspective*; *transformative perspective*; *analysis of instrument design*; *evaluation of actual effectiveness* and *discussion*. The SIA has been developed in this thesis as a simple but fundamental and relevant method, in order to evaluate the effectiveness of the 'soft' and 'hard' climate policy instruments.

Chapter Two and Three determine the most relevant approach to developing the analytical methods (i.e. Identification & Trend Analysis/ Method and Effectiveness Analysis/ Method) for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions.

The Identification & Trend Analysis/ Method devised for identifying the trend use of 'soft' and 'hard' climate policy instruments comprises two approaches, namely: the CCPIC and DSHCI. The Effectiveness Analysis/ Method was devised for examining the actual impacts of 'soft' 'hard' instrument activities, and led to the SIA approach being developed. The development of the methods in these chapters completes the first aim of this thesis, which was to develop methods for identifying the influence of 'soft' and 'hard' instruments. These methods have allowed this thesis to examine the second aim of this thesis, namely to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions by following the methods developed in the first aim.

Before moving on to the second aim of this thesis, Chapter Four explored the development of Australia's climate change policy as an empirical case study. This Chapter established the need to consider the effectiveness of the climate change policy in the chosen period of 1997-2007. The Australian government designed and implemented an individual domestic approach largely dominated by voluntary-based activities during the period, without taking global responsibility as a developed nation for reducing GHG emissions through its failure to ratify the global international agreement on climate change action (i.e. Kyoto protocol). Australia's domestic climate policy of this era reflects one of the most critical periods in terms of GHG mitigation policy by one of the most carbon intensive nations. This Chapter has addressed the unique circumstances in Australia, including, the rapid population growth and land use patterns, and the dominance of economic resources by large energy intensive and carbon intensive manufacturing and products. These findings were essential context for the following case studies in order to address and appreciate their background and the significance of this.

Chapter Five turned to the second aim and presented analysis of the empirical case studies. These studies were intended to accomplish the second aim of this whole thesis, by applying the method developed in the first aim to determine the influences of 'soft' and 'hard' instruments on reducing GHG emissions. In this chapter, this thesis applies the Identification & Trend Analysis/ Method for identifying the trend use of 'soft' and 'hard' instruments (i.e. CCPIC and DSHCI approaches) and examines analysis of its empirical case studies. This chapter considered three themes: a) the types of policy instruments utilised by the Australian government during the period 1997-2007; b) how such instruments varied according to the criteria developed in this thesis for assessing 'hard' and 'soft' policy instruments and c) what the trend usage of such instruments was over time.

Results obtained by the CCPIC with the six climate instrument categories explain what sorts of instruments were used under the policy. The results clarify that large numbers of policy instruments used during the period were mixed instruments although the analysis with the six instrument categories simply illustrates types of instruments but not their level of relative dominance (i.e. 'soft' and 'hard'). The case study also shows that the government used more mixed instruments in climate policy and that policy makers cannot easily recognise which instruments are 'soft' or 'hard' in terms of clear instrument characteristics and their effectiveness. In other words, policy makers can fail to recognise that voluntary measures are not always applied as 'soft' instruments, and that regulations are not always applied as 'hard' instruments. Following the results, this analysis further identified whether instruments were 'soft' or 'hard' instruments in climate change policy and examined the trend use namely: how a government allocates its adoption of 'soft' and 'hard' instruments.

Results obtained by the DSHCI approach to classifying of the level of coercion between 'soft' and 'hard' instruments with 17 evaluative criteria showed that the Australian national initiatives on the climate change policy during the period 1997-2007 were largely reliant on relatively 'soft' instruments, with a tendency to increase the use of softer instruments over time. Most of the instruments used in this period were also designed without strong incorporation with government intervention, regulation/legal binding and penalties. Moreover, there was a strong preference by government to focus on incentive-based, information-based and auditing based approaches (i.e. information, education, incentives, guidelines and auditing) as many commentators have noted.

Chapter Six and Seven further demonstrated the Effectiveness Analysis/ Method for examining the actual impacts of 'soft' and 'hard' instrument activities on reducing GHG emissions during the period 1997 to 2007 in Australia. Chapter Six demonstrated the application of the SIA method for the case of Australia's climate policy. First, two case studies were selected from the results in Chapter Five: The MRET is identified as a 'hard' instrument and Greenhouse Challenge Program as a 'soft' instrument. This thesis has examined these two case studies as the most relevant to its analysis but also has two significant Australian programs. This thesis has then applied the SIA method to the case studies. The results from the SIA in this chapter also allowed this thesis to conduct a further discussion (Chapter Seven) on the determination of the relative effectiveness of 'soft' and 'hard' instruments in the case of Australia's climate policy.

The results show a number of findings from the SIA approach that 'hard' instruments were relatively more effective in reducing GHG emissions than 'soft' instruments over the period, although the study has failed to make a clear distinction in the relative effectiveness of 'soft' versus 'hard' instruments, due to insufficient details available about the GCP in government reports over the period. In specific terms, in relation to analysing the 'success and failure' of 'soft' and 'hard' instruments, the 'hard' instruments met their intended targets over time, where they were not ambitions, but the 'soft' instruments failed to meet their targets at all. The study also concluded that 'soft' instruments have fundamentally failed at a basic level to provide the desired outcomes of policy initiatives towards reducing GHG emissions, because they tended to be symbolic policies, which gave insufficient information and lacked information consistency, in comparison to 'hard' instruments.

Chapter Seven draws together and develops the arguments of main importance to this thesis, in terms of aims, arguments and significance. These discussions in Chapter Seven led this thesis to its conclusions. It considered the key aims. The first was to develop methods for identifying the influence of 'soft' and 'hard' instruments in terms of reducing GHG emissions; and the second was to determine the influences of 'soft' and 'hard' instruments by following the methods developed in the first aim. The fulfilments of the two inter-related aims now lead this thesis to answer the main purpose of this whole thesis.

In response to the main purpose of this thesis, which is to examine the influences of 'soft' and 'hard' policy instruments in climate policy, especially in reducing GHG emissions, this study has firstly recognised that seeking the degree of power relations/ coerciveness between 'soft' and 'hard' instruments helps to distinguish whether instruments are 'soft' and 'hard'. This thesis has established that the degree of power relations/ coerciveness depends on the level of relative dominance (i.e. 'soft' and 'hard'), namely whether an instrument includes government intervention, regulation/legal bindings and penalties. Although the method may have some limitations, which potentially include the level of regulations, the level of emission targets and the level of governmental interventions, this thesis has simply identified the distinction.

In its empirical case studies, the results in this thesis show that the Australian national initiatives on the climate policy during the period 1997-2007 were largely reliant on relatively 'soft' instruments, with a tendency to increase the use of softer instruments over time. In addition, the results concluded that 'hard' instruments were relatively more effective in reducing GHG emissions than 'soft' instruments in the case of Australia's climate policy during the period.

Although this thesis found these influences in the case of Australia's climate policy during the period, this thesis has concluded that the influence of 'soft' and 'hard' instruments on reducing GHG emissions can be different in different countries, depending on their economic, political and institutional circumstances. Furthermore, this does not mean that using 'soft' instruments is always ineffective nor that 'hard' instruments effective: there is a need for the balance of the degree of power relations between 'soft' and 'hard' instruments in order to choose the most effective instruments for reducing GHG emissions, depending on different policy targets (i.e. direct or indirect targets[67]). Moreover, in practice, any instrument activities are also related to a variety of influences, including government's 'top-down' and 'bottom-up' approaches, in terms of political, administrative and institutional influences, and international and domestic influences.

Neither is it possible to ignore the influences of other internal and external factors (Hood 1986; Linder and Peters, 1989; De Bruijn and Hufen, 1990; Sinclair 1997; Bemelmans-Videc et al. 1998; Perrels 2001; Annandale et al 2004). The study is thus not capable of addressing total effectiveness from these external factors, but can be used for a basic understanding of the effectiveness of 'soft' and 'hard' instruments. This study has intended to provide a basic and simple approach, and can be a good start to further development of the 'coercive analyses' in public policy, especially in climate policy. Thus understandings of these external influences will make a clear linkage to the *gap*[68] , which will create further comprehensive analysis.

[67] Social approaches can provide better interpretive frames and encourage organisations to acquire the knowledge that leads to better environmental outcomes (Hertin et al 2004). Instrument choice depends on a different focus on the different targets and some GHG mitigation activities do not target direct emission reduction effects but others do, impacts of direct emission reduction should not only become the central solution for reducing GHG emissions, but also targets for indirect reduction for social improvement (EEA, 1996; Aldy et al., 2003; OECD, 2001).

[68] This study has revealed external influences on the effectiveness of 'soft' and 'hard' instruments by addressing their criticisms, such as: political influences on the level of target settings, timelines and penalty rates; and influences of fundamental framework type (i.e. 'business as usual') and the type of institutional frameworks (i.e. ownership by government or industry). The relationship between these

Finally, this thesis has emphasised developing policy instrument analysis in relation to climate policy, especially with regard to the reduction of GHG emissions. It has been argued that it is thus essential to consider the relationships between immediate policy actions on reducing GHG emissions and the right choice of policy instruments. Furthermore, the right choice of policy with the appropriate balance between non-coercive and coercive instruments, referred to as 'soft' and 'hard' instruments in this thesis, is one of the most critical issues in order to achieve significant reduction targets at the domestic level and therefore contributes to reducing emissions globally. Leaders in each country still need to seek the appropriate choices at domestic and international levels, and a study such as this thesis has shown that an analysis for 'soft' and 'hard' instruments is thus essential for improving future policy decisions.

The Strengths and Limitations of the Methodological/Analytical Tools Developed

Analytical methods (i.e. the Identification & Trend Analysis/ Method and Effectiveness Analysis/ Method) were developed and applied in empirical case studies in this thesis, can be useful evaluative method for instrument study and have clearly demonstrated the illustration of the degree of 'softness' and 'hardness' of instruments and their effectiveness. The Identification of Trend Analysis allows policy makers to determine a simple and clear classification of the level of coercion between 'soft' and 'hard' instruments. This method may also help policy makers to address the extent of governmental control during a certain period of time.

The Effectiveness Analysis, which allows policy makers to identify strengths and weaknesses of instrument design by government in terms of urgent action in order to reduce GHG emissions. The developed methods overcome a critical question in the instrument study: how to develop a simple and clear method of identifying how 'soft' and 'hard' instruments can be classified. The key criticism is that illustrating the relations between 'soft' and 'hard' instruments including policy influences and outcomes, tends to lead to uncertainty, especially where mixed instruments are applied in such areas as environmental policy. Thus, these methods are regarded in

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criticisms and the results in this study still represent a *gap* in the review process. This study focused on seeking a clear indication of 'success or failure' of 'soft' and 'hard' instruments, which this research has and acknowledges this success or failure as one of the most significant aspects in the field of study.

this thesis, as very significant evaluative methods for evaluating the influence of policy instruments, especially for climate change policy.

On the other hand, there is still a number of limitations on the developed methods. First, the usual limitations that affect the instrumentalist methodological approach have been identified here and attempts have been made to improve the relative lack of theoretical analysis. The method derived from 'Instrumentalism' is incorporated here with 'coercive analysis', and a new synthesised Identification & Trend Analysis/ Method developed for examining the effectiveness of 'soft' and 'hard' instruments. This analytic approach is intended to be regarded as a new, all-encompassing theoretical approach for analysis of climate change policy in Australia and potentially other nations. In addition to the limitation of methods, this thesis emphasises determining the simple classification of 'soft' and 'hard' policy instruments. It focuses on establishing the specific key elements of functional policy activities, such as examining whether a national program is a 'soft' or 'hard' instrument, by looking at a number of key elements such as setting targets and monitoring systems, rather than measuring degrees of carbon reduction targets, reliability of persuasion or regulation/ legal bindingness or the balance between the restriction and cost effectiveness under an instrument. These latter concerns, whilst significant, are not without their own analytic challenges but are beyond the scope of this thesis.

Another limitation of the analysis is the application of instrument categories, based on the instrument category in the UNFCCC guidelines.[69] The data in the *Australian National Communication Report* (2002, and 2005) acknowledged a range of national initiatives including existing and future programs. However, the definitions of policy instruments under the UNFCCC instrument category are not the same as those proposed by this thesis. The intention of this study was not to categorise all the national initiatives during the period; instead thus this thesis uses selected instrument categories similar to instrument categories from the Australian national communication reports. The other reason for selecting these instrument categories is that there has not yet been a strong move to adopt a clear, simple and formulated

[69] UNFCCC [United Nations Framework Convention on Climate Change]. 1999. Review of the Implementation of Commitments and of Other Provisions of the Convention.

categorisation of types of climate policy instruments[70] at the international level, for contracting parties to the UNFCCC to use for their national reports. Indeed different countries have used different instrument categories in such reporting (UNFCCC 2003; and 2007).

Despite their limitations, the findings from the analyses help policy makers to understand how a national government designs policy instruments and their influences. The analyses also reveal that each instrument is employed by the national government and intended to meet its individual goals, but with differing levels of government control. The study in this thesis is thus not only a very significant tool for policy makers who review climate policy but also an examination of coerciveness in policy instruments in the field of public policy. Furthermore, a clear identification of the influences of 'soft' and 'hard' climate policy instruments helps to address the extent of governmental control during a certain period of time, and to show a clear picture of the instrument design and preferences of the government's own instrument approaches in terms of reducing GHG emissions. The findings from this study will assist policy makers who review climate policy and the national initiatives from an instrument point of view, to more properly appreciate instrument characteristics.

Outline of Future Areas of Research from This Work

This thesis has had a special focus on Australia's climate policy 1997-2007. An examination of countries which must consider the reduction of GHG emissions is critical. The domestic climate policy of the decade in question reflects actions in one of the most carbon intensive developed countries, which must consider a significant reduction in GHG emissions, and be responsible for leading strong global action. The study concludes that the policy design based on voluntary-based instruments during 1997-2007 did not encourage a significant reduction of GHG emissions, while overall emission trends showed that the country increased emissions over this time. However, this study intends not only to help better instrument choices for the future in Australia,

[70] The instrument categories used in the national communication reports are based on the 'UNFCCC guidelines on reporting and reviewing', which have been provided by the UNFCCC for Annex I parties. These guidelines suggest what a national communication report should contain, and include illustrations of 'type of policy instrument' (UNFCCC 1999). Although these guidelines show that Annex I parties should describe their instrument types, they do not clearly formulate the categories of according to international standards. Moreover, their suggestions do not apply to all the contracting countries. The *Complication and synthesis report also* describes the difficulty of a review of instrument activities, especially of an classification of instrument types (UNFCCC 2003; and 2007)..

but also the future instrument choices by other carbon intensive countries which seek significant reductions of GHG emissions.

Future research could apply the methods developed in this thesis to other case studies in climate change policy. Further study may be continued by employing the application of the developed methods in this thesis for other nations, particularly carbon intensive countries. This may result in creating a broader picture of the influence of soft and hard instruments on the reduction of GHG emissions across nations and may also allow policy makers to enable to identify a clear view of strengths and weakness of a government in each nation in order to achieve in such a global contribution.

Lastly, a range of future areas of research may be considered following this study. First, a research may improve the ideas and/or concepts of the methods developed in this thesis. In specific terms, this may expand the views of analytical method used in this thesis and employ a more comprehensive analytical method for the classification of coerciveness between soft and hard instruments than a simple method; including, measuring degrees of carbon reduction targets, reliability of persuasion or regulation/ legal bindingness or the balance between the restriction and cost effectiveness under an instrument. This type of research may also require a new data collection process, in order to establish the most relevant approach of this study. Second, research may develop instrument categories not only for climate change policy, but also for other related environmental and/or energy policy. As mentioned before, there has not yet been clear definition of instrument categories, even under the UNFCCC guidelines established. This results in an unclear mapping of instrument selections and designs in each nation, which is necessary for further improvements; especially for a comparative policy analysis is undertaken for addressing a picture of policy instrument designs at international level.

Further research of this kind has the potential to improve climate change policy instrument design.

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Appendix

1 National Initiatives, 1997-2007

1.1 National Initiatives 1997-2007

No	Programs	Time-line	Instrument	Host	Level
1	Greenhouse Gas Abatement Program	1999-2007	Economic	Cwlth	MD
2	Greenhouse Friendly Program	2001-2004	Information /economic	Cwlth	MD
3	Low Emissions Technology Demonstration Fund	2005-2006	Economic	Cwlth	LD
4	International Climate Change	1998-2007(ongoing)	Information(i e information & education) /voluntary /R&D /economic	Cwlth	MD
5	Greenhouse GCP Plus	2005-2007(ongoing)	Voluntary /regulatory /economic	Cwlth	MD
6	Local Greenhouse Action	1997-2007	Voluntary (negotiated)/info(education)	Cwlth,S&T,L	MD
7	Government Operation	1997-2003/2005-ongoing	Voluntary (negotiated)	Cwlth,S&T	MD
8	Energy Market Reform	2001-2007 (ongoing)	Regulatory	Cwlth,S&T	MostD
9	Generator Efficiency Standard	2000-2004	Voluntary (negotiated)	Cwlth	MD
10	Renewable Energy Development Initiative (REDI)	2005-2007 (ongoing)	Economic/research	Cwlth	LD
11	Mandatory Renewable Energy Target (MRET)	2001-2007 (ongoing)	Regulatory	Cwlth	MostD
12	Energy Performance Codes for domestic appliance (NAEEEP)	1997-2007 (ongoing)	Regulatory/voluntary	Cwlth,S&T	HD
13	Energy Efficiency Best Practice and Benchmarking Program (EEBP)	1998-2003	Voluntary (negotiated)	Cwlth	MD
14	Eco-Efficiency Program	2005-2007 (ongoing)	Voluntary (negotiated)	Cwlth	LD
15	Queensland Centre for Low Emission Technology	2003-2007	R&D	Cwlth, Qld	LD
16	National Framework for Energy Efficiency (NFEE)	2004-2007	Regulatory/information (i.e education)	Cwlth,S&T	HD
17	Energy Efficiency Opportunities Program (EEO)	2006-2007 (ongoing)	Regulatory	Cwlth	HD
18	Low Emission Technology and Abatement Program (LETAP)	2006-2007 (ongoing)	Economic	Cwlth	LD
19	Advanced Electricity Storage Technologies Program (ARSTP)	2005-2007 (ongoing)	Economic	Cwlth	LD
20	Solar Cities	2005-2007 (ongoing)	Economic	Cwlth	LD
21	Wind Energy Forecasting Capability Initiative	2004-2007 (ongoing)	R&D/Economic	Cwlth	LD
22	Strategic Development of Renewable Energy	1997-2007	Economic	Cwlth,S&T	LD
23	START Program	2002-2007	Economic/R&D	Cwlth	MD
24	Australia's Onshore Energy Security Program	2007-	Economic	Cwlth	MD

25	National Cycling Strategy (NCS)	1994-2004/2005-2007 (ongoing)	Economic	Cwlth	MD
26	Motor Vehicle Environment Committee (MVEC) Strategy	1999-2001	information/regulatory/voluntary	Cwlth	MD
27	Diesel and Alternative Fuels Grants Scheme	2000-2002 (ongoing)	Economic	Cwlth	LD
28	Alternative Fuels Conversion Program	2000-2007 (ongoing)	Economic	Cwlth	HD
29	CNG Infrastructure Program	2000-2004	Economic	Cwlth	LD
30	Energy Grants (credits) Scheme	2003-2005	Economic	Cwlth	LD
31	Bio-fuels Capital Grants Program	2003-2004	Economic	Cwlth	MD
32	350ML Bio-fuels Target	2003-2007 (ongoing)	Economic	Cwlth	HD
33	Ethanol Distribution Program	2006-2007 (ongoing)	Economic	Cwlth	MD
34	LPG Conversion Grants	2006-2007 (ongoing)	Economic	Cwlth	MD
35	Strategic Transport Planning & Development	2004-2007	Various	Cwlth,S&T,L	MD
36	Plantations for Australia-the 2020 vision	1997-2007	Economic /information	Cwlth	MD
37	The Farm Forestry Program by NHT	1996-2002	Economic /information	Cwlth	HD
38	Bush for Greenhouse	1998-2004	Economic /information	Cwlth	LD
39	National Action Plan for Salinity and Water Quality	2001-2007	Information /R&D	Cwlth	MD
40	Greenhouse Action in Regional Australia	2004-2007	Information /R&D	Cwlth	LD
41	National Landcare Program	1996-2007	Economic /information	Cwlth,S&T	LD
42	Greenhouse and Agriculture Taskforce	1997-2002	Information	Cwlth,S&T	MD
43	Rumen Modifiers	1997-2007 ongoing	R&D	Cwlth,S&T	LD
44	Environmental Management Systems (EMS) under NHT	2003-2007	Economic/voluntary	Cwlth	LD
45	Ozone Protection and Synthetic Greenhouse Gas Management	1989-/1997-2007(ongoing)	Regulatory	Cwlth	HD
46	NHT-waste management awareness program	1996-2002	Information	Cwlth	MD
47	Australian Government state and local waste strategies	1992-/1997-2007 (ongoing)	Voluntary/regulatory	Cwlth,S&T	HD
48	Greenhouse Challenge	1997-2004	Voluntary (negotiated)	Cwlth	MD
49	Ethanol Production Program	2002-2007	Economic	Cwlth, S&T	LD
50	COAL 21 National Action Plan	2003-2007	R&D	Cwlth	MD
51	Diesel Fuel Rebate Scheme	1999-2002	Economic	Cwlth	LD
52	Tax Fuels Scheme	2006-(ongoing)	Economic	Cwlth	LD

1.2. National Initiatives by Sectors

1.2.1 Cross-Sectoral

Names	Time Line	Instrument	Host
Greenhouse Gas Abatement Program (GGAP)	2000-2007	Economic	Cwlth
Low Emissions technology Demonstration Fund	2005-2006	Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth
Greenhouse GCP Plus	2005-2007 (ongoing)	Voluntary/ Regulatory (fuel tax credits since 2006)	Cwlth
Local Greenhouse Action	2004-2007 (ongoing)	Voluntary/ Negotiated agreements/ Education	Cwlth, S&T, L
Greenhouse Challenge Program	1997-2004	Voluntary/negotiated agreement	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth

1.2.2 Energy-Stationary

Names	Time line	Instrument	Host
Government Operations	1997-2003 2005-ongoing	Voluntary/ Negotiated agreement	Cwlth, and S&T
Local Greenhouse Action-stationary energy element	1997-2007 (ongoing)	Voluntary/ Negotiated agreement/ Education (informaiton)	Cwlth, and S&T
Energy Market Reform	2001-2007 (ongoing)	Regulatory	Cwlth, and S&T
Generator Efficiency Standard	2000-2004	Voluntary/ Negotiated agreement/	Cwlth
Renewable Energy Development Initiative (REDI)	2005-2007 (ongoing)	Economic	Cwlth
MRET	2001-2007 (ongoing)	Regulatory	Cwlth
Energy Performance Codes for domestic appliance (NAEEEP)	1997-2007 (ongoing)	Regulatory/ Voluntary	Cwlth, S&T
Energy Efficiency Best Practice and Benchmarking Program (EEBP)	1998-2003	Voluntary/ Negotiated agreements	Cwlth
Eco-Efficiency Program	2005-2007 (ongoing)	Voluntary/ Negotiated agreement	Cwlth
Low Emissions Technology Demonstration Fund (LETDF)	2005-2006	Economic	Cwlth
Queensland Centre for Low Emission Technology	2003-2007	Research	Cwlth, Queensland
National Framework for Energy Efficiency (NFEE)	2004-2007	Regulatory/Information/ Education	Cwlth, S&T
Energy Efficiency Opportunities Program (EEO)	2006-2007 (ongoing)	Regulatory	Cwlth
Low Emission Technology and Abatement Program (LETAP)	2006-2007 (ongoing)	Economic	Cwlth
Advanced Electricity Storage Technologies Program (AESTP)	2005-2007 (ongoing)	Economic	Cwlth
Solar Cities	2005-2007 (ongoing)	Economic	Cwlth
Wind Energy Forecasting Capability Institutive	2004-2007 (ongoing upto 2009)	Research	Cwlth
Strategic development of renewable energy	1997-2007	Economic	Cwlth and S&T
GGAP	1999-2007 (ongoing upto 2013)	Economic	Cwlth
Greenhouse Challenge Program	1997-2004	Voluntary/negotiated agreement	Cwlth
Greenhouse GCP Plus	2005-2007 (ongoing)	Voluntary/ Regulatory (fuel tax credits since 2006)	Cwlth
START program	2002-2007	Economic and R&D	Cwlth
Renewable Energy Equity Fund (REEF)	1997-2007	economic	Cwlth
Australia's Onshore Energy Security Program	2007	Economic	Cwlth
COAL 21 National Action Plan	2003-2007	R&D	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth

1.2.3 Transport

Names	Time line	Instrument	host
National Cycling Strategy (NCS)	1999-2004 2005-2007 (ongoing upto 2010)	Economic	Cwlth
Motor Vehicle Environment Committee (MVEC) Strategy	1999-2001	Information/ Regulatory Voluntary	Cwlth
Diesel and Alternative Fuels Grants Scheme	2000-2002	Economic	Cwlth
Diesel Fuel Rebate Scheme	1999-2002	Economic	Cwlth
Energy Grants (credits) Scheme	2003-2005	Economic	Cwlth
Tax Fuels Sheme	2006-(ongoing)	Economic	Cwlth
Alternative Fuels Conversion Program	2000-2007 (upto 2008)	Economic	Cwlth
CNG Infrastructure Program	2000-2004	Economic	Cwlth
Bio-fuels Capital Grants Program	2003-2004	Economic	Cwlth
350 ML Bio-fuels Target	2003-2007 (upto 2010)	Economic	Cwlth
Ethanol Distribution Program	2006-2007 (upto 2014)	Economic	Cwlth
Ethanol Production Program	2002-2007	Economic	Cwlth,S&T
LPG Conversion Grants	2006-2007 (upto 2014)	Economic	Cwlth
Strategic Transport Planning & Development	2004-2007	Various	Cwlth, S&T, and L
GGAP-transport energy elements	1999-2007 (ongoing upto 2013)	Economic	Cwlth,
Greenhouse Challenge	1997-2004	Voluntary/Negotiated	Cwlth
Greenhouse GCP Plus	2005-2007 (ongoing)	Voluntary/ Regulatory (fuel tax credits since 2006) and Economic	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
Local Greenhouse Action-transport energy elements	2004-2007 (ongoing)	Voluntary/ Negotiated agreements/ Education	Cwlth, S&T, L
Low Emissions technology Demonstration Fund	2005-2006	Economic	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth

1.2.4 Fugitive

Names	Time line	Instrument	Host
Low Emission Technology Demonstration Funds-Fugitive emissions elements	2005-2006	Economic	Cwlth
GGAP-fugitive emissions elements	1999-2007 (ongoing upto 2013)	Economic	Cwlth
Greenhouse Challenge-fugitive emissions elements	1997-2004	Voluntary/negotiated	Cwlth
Greenhouse GCP Plus -fugitive emissions elements	2005-2007 (ongoing)	Voluntary/ negotiated agreement/ Regulatory (fuel tax credits since 2006) and Economic	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth

1.2.5 Industrial Process

Names	Time-line	Instrument	Host
Ozone Protection and Synthetic Greenhouse Gas Management	1989-(ongoing) 1997-2007	Regulatory	Cwlth
NHT-waste management awareness program	1996-2002	information	Cwlth
Australian Government State and Local Waste Strategies	1992-/1997-2007 (ongoing)	Voluntary/regulatory	Cht, S&T
GGAP	1999-2007 (ongoing upto 2013)	Economic	Cwlth
Greenhouse Challenge	1997-2004	Voluntary/Negotiated	Cwlth
Greenhouse GCP Plus -industrial processes elements (including Best Practice Management of SF4)	2005-2007 (ongoing)	Voluntary/ Regulatory (fuel tax credits since 2006) and Economic	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth

1.2.6 Agriculture

Names	Time-line	Instrument	Host
Greenhouse and Agriculture Taskforce	1997-2002	Information	Cwlth, S&T
Agriculture Sector Work Program	1997-2002	Information	Cwlth,, S&T
Rumen Modifiers	1997-2007 (ongoing)	Research	Cwlth, S&T
Greenhouse Action in Regional Australia	2004-2007 (ongoing)	Information/ Research	Cwlth
Environmental Management Systems (EMS)	2003-2007	Economic/ Voluntary	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth

1.2.7 Waste

Names	Time line	Instrument	Host
Waste management awareness program NHT	1996-2002	Information	Cwlth
Australian Government state, territory, and local government waste management strategies local waste strategies	1992- 1997-2007	Voluntary/ Regulatory	Cwlth, S&T
Greenhouse Challenge—waste elements	1997-2004	Voluntary/Negotiated	Cwlth
Greenhouse GCP Plus -waste elements	2005-2007 (ongoing)	Voluntary/ Regulatory (fuel tax credits since 2006) and Economic	Cwlth
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth

1.2.8 LULUCF

Names	Time line	Instrument	Host
Plantations for Australia-the 2020 vision	1997-2007	Economic/ Information	Cwlth
The Farm Forestry Program by NHT	1996-2002	Economic/ Information	Cwlth
Bush for Greenhouse	1998-2004	Economic/ Information	Cwlth
National Action Plan for Salinity and Water Quality	2001-2007	Information/ Research	Cwlth
Greenhouse Action in Regional Australia	2004-2007	Information/ Research	Cwlth
GGAP-land use, land use change and forestry elements	1999-2007 (ongoing upto 2013)	Economic	Cwlth,
National Landcare Programmes	1996-2007	Economic Information	Cwlth, S&T
Greenhouse Friendly Program	2001-2004	Information/ Economic	Cwlth
International climate change	1998-	Information/ Education/ Voluntary/ Research	Cwlth

2 Results sorted by Instrument Categories

2.1 National Initiatives 1997-2007

	Economic	Regulatory	Voluntary	R&D	Information-based	Various
National Initiatives 1997-2007	19	4	5	3	2	19

2.2 Distribution of various instruments 1997-2007

	Economic	Regulatory	Voluntary	R&D	Information-based	etc
Various	11	5	7	4	7	1

2.3 The instrument trend uses under the national initiatives 1997-2007

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Regulatory	1	1	1	1	3	3	3	3	3	4	4
Voluntary	1	3	3	4	4	4	4	2	2	2	2
Economic	2	2	4	7	7	8	9	9	10	13	14
R&D	1	1	1	1	1	1	3	3	3	3	3
Information-based	2	2	2	2	2	2	0	0	0	0	0
Mixed	6	8	9	9	11	10	10	15	15	15	15

2.4 The instrument trend uses under the national initiatives 1997-2007 including various instruments

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Regulatory	3	3	4	4	6	5	5	6	7	8	8
Voluntary	4	7	8	9	9	8	9	7	8	8	8
Economic	5	7	9	12	13	15	16	17	17	20	21
R&D	1	2	2	2	3	4	6	8	9	9	9
Information-based	5	7	8	8	10	9	7	9	7	7	7
Etc	0	0	0	0	0	0	0	1	1	1	1

2.5 The national initiatives at sectoral level 1997-2007 including various

	Energy-stationary	Energy-transport	Energy-fugitive	Industrial Process	Agriculture	Waste	LULUCF
Economic	9	14	2	1	0	0	1
Regulatory	3	0	0	1	0	0	0
Voluntary	5	2	1	1	0	1	0
R&D	3	0	0	0	1	0	0
Information-based	0	0	0	1	1	1	0
Vrious	7	7	3	5	4	5	8

2.6 The national initiatives at sectoral level 1997-2007

	Energy-stationary	Energy-transport	Energy-fugitive	Industrial Process	Agriculture	Waste	LULUCF
Economic	11	16	4	3	2	2	6
Regulatory	6	2	1	3	0	2	0
Voluntary	9	6	3	5	2	4	1
R&D	5	1	1	2	3	0	3
Information-based	4	4	2	3	4	3	8
Etc	0	1	0	0	0	0	0

3 The instrument trend uses at sectoral level 1997-2007

3.1 Energy-stationary

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Economic	2	2	3	3	4	5	5	5	9	10	11
Regulatory	1	1	1	1	3	3	3	4	5	6	6
Voluntary	3	6	6	7	7	7	7	5	6	6	6
R&D	0	1	1	1	1	2	4	5	5	5	5
Information-based	1	2	2	2	3	3	3	4	3	3	3
Etc	0	0	0	0	0	0	0	0	0	0	0

3.2 Energy-transport

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Economic	0	0	3	6	7	8	9	9	8	10	9
Regulatory	0	0	1	1	1	0	0	0	1	1	1
Voluntary	1	2	3	3	3	2	2	3	3	3	3
R&D	0	1	1	1	1	1	1	1	1	1	1
Information-based	0	1	1	1	1	1	1	2	2	2	2
etc	0	0	0	0	0	0	0	1	1	1	1

3.3 Energy-fugitive

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Economic	0	0	1	1	1	1	1	1	3	3	3
Regulatory	0	0	0	0	0	0	0	0	1	1	1
Voluntary	1	2	2	2	2	2	2	2	2	2	2
R&D	0	1	1	1	1	1	1	1	1	1	1
Information-based	0	0	0	0	1	1	1	1	0	0	0
Etc	0	0	0	0	0	0	0	0	0	0	0

3.4 Industrial Process

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Economic	0	0	1	1	2	2	2	2	3	2	2
Regulatory	2	2	2	2	2	2	2	2	3	3	3
Voluntary	2	3	3	3	3	3	3	3	4	4	4
R&D	0	1	1	1	1	1	1	1	1	1	1
Information-based	1	2	2	2	3	3	2	2	2	1	1
Etc	0	0	0	0	0	0	0	0	0	0	0

3.5 Waste

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Economic	0	0	0	0	1	1	1	1	1	1	1
Regulatory	1	1	1	1	1	1	1	1	2	2	2
Voluntary	2	3	3	3	3	3	3	3	3	3	3
R&D	0	1	1	1	1	1	1	1	1	1	1
Information-based	1	2	2	2	3	3	2	2	1	1	1
Etc	0	0	0	0	0	0	0	0	0	0	0

3.6 LULUCF

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Economic	3	4	5	5	6	6	5	5	3	3	3
Regulatory	0	0	0	0	0	0	0	0	0	0	0
Voluntary	0	1	1	1	1	1	1	1	1	1	1
R&D	0	1	1	1	2	2	2	3	3	3	3
Information-based	3	5	5	5	7	7	6	7	5	5	5
Etc	0	0	0	0	0	0	0	0	0	0	0

3.7 Agriculture

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Economic	0	0	0	0	1	1	2	2	1	1	1
Regulatory	0	0	0	0	0	0	0	0	0	0	0
Voluntary	0	1	1	1	1	1	2	2	2	2	2
R&D	1	2	2	2	2	2	2	3	3	3	3
Information-based	1	2	2	2	3	3	2	3	2	2	2
Various	0	0	0	0	0	0	0	0	0	0	0

4. Results by the DSHCPI method for the level of Soft and Hard Instruments 1997-2007 at the National Level

4.1 Results by the DSHCPI method for the level of Soft and Hard Instruments 1997-2007 at the National Level

No.	Programs	Time-line	Information	Educational Support	Incentives support	Measurable Targets	Specific Timeframe	Guideline	Monitoring	Reporting and Certification	Auditing	Public Disclosure	Contractual Improvement	Any Market Device	Any Standards	Penalty for Polluter Pay	Penalty for Non-participation	Penalty for Non-compliance	Penalty for Non-Meeting	Score	Level for soft or hard
1	Greenhouse Gas Abatement Program	1999-2007	×	×	×			×			×									5	MD
2	Greenhouse Friendly Program	2001-2004	×	×	×			×			×			×	×					7	MD
3	Low Emissions Technology Demonstration Fund	2005-2006			×	×	×													3	LD
4	International Climate Change	1998-2007(ongoing)	×	×	×			×	×	×	×									7	MD
5	Greenhouse GCP Plus	2005-2007(ongoing)	×	×	×	×	×	×			×			×	×					9	MD
6	Local Greenhouse Action	1997-2007	×	×	×			×	×	×	×									7	MD
7	Government Operation	1997-2003/2005 (ongoing)	×	×	×	×	×	×	×					×	×					9	MD
8	Energy Market Reform	2001-2007 (ongoing)	×	×	×	×	×	×	×	×	×	×		×	×		×	×	×	15	MostD
9	Generator Efficiency Standard	2000-2004	×	×		×	×	×			×				×					7	MD
10	Renewable Energy Development (REDI)	2005-2007 (ongoing)			×						×									2	LD
11	Mandatory Renewable Energy Target (MRET)	2001-2007 (ongoing)	×	×	×	×	×	×		×	×	×	×	×	×			×	×	14	MostD

12	Energy Performance Codes for domestic appliance (NAEEEP)	1997-2007 (ongoing)	×	×	×	×	×	×	×	×	×			×	×		×	×		13	HD
13	Energy Efficiency Best Practice and rking Program (EEBP)	1998-2003	×	×	×			×			×									5	MD
14	Eco-Efficiency Program	2005-2007 (ongoing)	×	×	×															3	LD
15	Queensland Center for Low Emission Technology	2003-2007			×						×									2	LD
16	National Framework for Energy Efficiency (NFEE)	2004-2007	×	×	×	×	×	×	×	×	×	×		×	×					12	HD
17	Energy Efficiency Opportunities Program (EEO)	2006-2007 (ongoing)	×	×	×	×	×				×	×			×		×	×		10	HD
18	Low Emission Technology and Abatement Program (LETAP)	2006-2007 (ongoing)			×						×									2	LD
19	Advanced Electricity Storage Technologies Program (ARSTP)	2005-2007 (ongoing)			×						×									2	LD
20	Solar Cities	2005-2007 (ongoing)			×						×									2	LD
21	Wind Energy Forecasting Capability	2004-2007 (ongoing)			×						×									2	LD
22	Strategic Development of Renewable Energy	1997-2007			×						×									2	LD
23	START Program	2002-2007	×	×	×			×	×	×	×							×		8	MD
24	Australia's Onshore Energy Security Program	2007-	×	×	×		×	×	×	×	×									8	MD
25	National Cycling Strategy (NCS)	1994-2004/2005-going)	×	×	×			×	×	×	×									8	MD
26	Motor Vehicle Environment Committee (MVEC) Strategy	1999-2001	×	×		×	×	×	×	×	×									8	MD
27	Diesel and Alternative Fuels Grants Scheme	2000-2002 (ongoing)			×			×			×							×		4	LD
28	Alternative Fuels Conversion Program	2000-2007 (ongoing)	×	×	×	×	×	×	×	×	×		×		×				×	12	HD
29	CNG Infrastructure Program	2000-2004			×						×									2	LD
30	Energy Grants (credits) Scheme	2003-2005			×			×			×							×		4	LD
31	Bio-fuels Capital Grants Program	2003-2004			×			×	×	×	×									5	MD
32	350ML Bio-fuels Target	2003-2007 (ongoing)	×	×	×	×	×	×	×	×	×			×						10	HD

33	Ethanol Distribution Program	2006-2007 (ongoing)			×	×	×	×	×	×	×									7	MD
34	LPG Conversion Grants	2006-2007 (ongoing)			×			×	×	×	×									5	MD
35	Strategic Transport Planning & Development	2004-2007	×	×	×			×			×				×					6	MD
36	Plantations for Australia-the 2020	1997-2007	×	×	×		×	×	×	×	×									8	MD
37	The Farm Forestry Program by NHT	1996-2002	×	×	×		×	×	×	×	×			×	×					10	HD
38	Bush for Greenhouse	1998-2004			×						×									2	LD
39	National Action Plan for Salinity and Water Quality	2001-2007	×	×	×	×	×	×	×	×	×									9	MD
40	Greenhouse Action in Regional Australia	2004-2007	×	×	×						×									4	LD
41	National Landcare Program	1996-2007	×	×	×						×									4	LD
42	Greenhouse and Agriculture Taskforce	1997-2002	×	×				×	×	×	×									6	MD
43	Rumen Modifiers	1997-2007 ongoing	×	×	×															3	LD
44	Environmental Management Systems (EMS) under NHT	2003-2007	×	×	×			×						×	×					4	LD
45	Ozone Protection and Synthetic Greenhouse Gas Management	1989-/1997- ongoing	×	×	×			×	×	×	×	×				×		×		10	HD
46	NHT-waste management awareness Program	1996-2002	×	×	×	×					×									5	MD
47	Australian Government state and local waste strategies	1992-/1997-2007 - ongoing	×	×	×	×	×	×	×	×	×	×								10	HD
48	Greenhouse Challenge	1997-2004	×	×	×			×			×									5	MD
49	Ethanol Production Program	2002-2007			×				×	×	×									4	LD
50	COAL 21 National Action Plan	2003-2007	×	×	×	×	×				×									6	MD
51	Diesel Fuel Rebate Scheme	1999-2002			×			×			×							×		4	LD
52	Tax Fuels Scheme	2006-(ongoing)			×			×			×							×		4	LD

No	Programs	Time-line	Information	Educational Support	Incentives support	Measurable Targets	Specific Timeframe	Guideline	Monitoring	Reporting and Certification	Auditing	Public Disclosure	Contractual Improvement	Any Market Device	Any Standards	Penalty for Polluter Pay	Penalty for Non-participation	Penalty for Non-compliance	Penalty for Non-Meeting	Score	Level for soft or hard
		Total	34	34	49	17	19	34	22	21	47	6	2	10	12	1	3	10	3		
		Numbe	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52		
		Percen	65.4	65 4	94 2	32.7	36 6	65 4	42 3	40 4	90 4	11 5	3 8	19 2	23 1	1 9	5 8	19 2	5 8		

4.2
Level of instruments 1997-2007

Level of Sort and Hard 1997-2007	Numbers
Least dominant [LD] level	20
Moderately dominant [MD] level	22
Highly dominant [HD] level	8
Most dominant [MostD] level	2
Total	52

	Economic	Regulatory	Voluntary	R&D	Information-based	Various
LD	11	0	1	2	0	6
MD	6	0	4	1	2	7
HD	2	2	0	0	0	4
MostD	0	2	0	0	0	0

4.3 Soft and Hard Instruments 1997-2007

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD (soft)	3	4	5	7	7	8	9	11	14	15	14
MD	7	9	11	12	12	14	14	13	11	13	14
HD	4	4	4	5	5	5	5	6	6	7	7
MostD (hard)	0	0	0	0	2	2	2	2	2	2	2

5 Soft and Hard Instruments 1997-2007 at the Sectoral-based

5.1 Soft and Hard Instruments 1997-2007 at the Sectoral-based

	Stationary	Transport	Fugitive	Industrial Process	Agriculture	Waste	LULUCF
LD	10	6	0	1	3	0	3
MD	12	13	6	5	3	5	5
HD	3	2	0	2	0	1	1
MostD	2	0	0	0	0	0	0

5.2 Energy-Stationary

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	2	2	2	2	2	2	3	4	9	10	9
MD	2	5	6	7	8	9	10	8	7	7	8
HD	0	0	0	0	0	0	0	1	1	2	2
MostD	0	0	0	0	2	2	2	2	2	2	2

5.3 Energy-Transport

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	0	0	1	2	2	2	2	2	2	3	2
MD	2	2	5	6	7	7	7	9	7	8	8
HD	0	0	0	1	1	1	2	2	2	2	2
MostD	0	0	0	0	0	0	0	0	0	0	0

5.4 Energy-Fugitive

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	0	0	0	0	0	0	0	0	0	0	0
MD	1	2	3	3	4	4	4	4	4	4	4
HD	0	0	0	0	0	0	0	0	0	0	0
MostD	0	0	0	0	0	0	0	0	0	0	0

5.5 Industrial Process

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	1	1	1	1	0	0	0	0	0	0
MD	1	2	3	3	4	4	4	4	4	3	3
HD	2	2	2	2	2	2	2	2	2	2	2
MostD	0	0	0	0	0	0	0	0	0	0	0

5.6 Waste

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	0	0	0	0	0	0	0	0	0	0	0
MD	2	3	3	3	4	4	3	3	2	2	2
HD	1	1	1	1	1	1	1	1	1	1	1
MostD	0	0	0	0	0	0	0	0	0	0	0

5.7 LULUCF

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	2	2	2	2	2	2	3	2	2	2
MD	1	2	3	3	5	5	5	5	4	4	4
HD	1	1	1	1	1	1	0	0	0	0	0
MostD	0	0	0	0	0	0	0	0	0	0	0

5.8 Agriculture

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	1	1	1	1	1	2	3	3	3	3
MD	1	2	2	2	3	3	2	2	1	1	1
HD	0	0	0	0	0	0	0	0	0	0	0
MostD	0	0	0	0	0	0	0	0	0	0	0

6 Results for Soft and Hard Instrument and The Emission Trend 1997-2007

6.1 Soft and Hard Instruments 1997-2007 and the Emission Trends

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	3	4	5	7	7	8	9	11	14	15	14
MD	7	9	11	12	12	14	14	13	11	13	14
HD	4	4	4	5	5	5	5	6	6	7	7
MostD	0	0	0	0	2	2	2	2	2	2	2
Emission trend	481 90	503.3	508.3	524.9	534.6	542 8	528.9	540 2	554 8	549.9	

6.2 Soft and Hard Instruments 1997-2007 at the Sectoral-based

	Stationary	Transport	Fugitive	Industrial Process	Agriculture	Waste	LULUCF
LD	9	6	0	1	3	0	3
MD	12	13	6	5	3	5	5
HD	3	2	0	2	0	1	1
MostD	2	0	0	0	0	0	0

6.3 Energy

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	1	2	3	3	3	4	5	10	12	10
MD	5	9	12	13	16	17	18	16	15	14	15
HD					0	0	0	2	2	4	4
MostD	0	0	0	0	2	2	2	2	2	2	2
Emission trend	329.7	342.4	349.5	357	364 5	368 4	381.1	386.7	395.1	400.9	

6.4 Energy-Stationary

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	1	1	1	1	1	2	3	8	9	8
MD	3	5	6	7	8	9	10	8	7	7	8
HD	0	0	0	0	0	0	0	1	1	2	2
MostD	0	0	0	0	2	2	2	2	2	2	2

6.5 Energy-Transport

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	0	0	1	2	2	2	2	2	2	3	2
MD	2	2	5	6	7	7	7	9	7	8	8
HD	0	0	0	1	1	1	2	2	2	2	2
MostD	0	0	0	0	0	0	0	0	0	0	0

6.6 Energy-Fugitive

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	0	0	0	0	0	0	0	0	0	0	0
MD	1	2	3	3	4	4	4	4	4	4	4
HD	0	0	0	0	0	0	0	0	0	0	0
MostD	0	0	0	0	0	0	0	0	0	0	0

6.7 Industrial Process

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	1	1	1	1	0	0	0	0	0	0
MD	1	2	3	3	4	4	4	4	4	3	3
HD	2	2	2	2	2	2	2	2	2	2	2
MostD	0	0	0	0	0	0	0	0	0	0	0
Emission trend	24.4	25.8	26	26.2	27 3	27.9	28 7	29.6	28 6	28 4	

6.8 Waste

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	0	0	0	0	0	0	0	0	0	0	0
MD	2	3	3	3	4	4	3	3	2	2	2
HD	1	1	1	1	1	1	1	1	1	1	1
MostD	0	0	0	0	0	0	0	0	0	0	0
Emission trend	17.5	17.1	17.3	17.3	15.6	17.8	17	16.7	17.6	16.6	

6.9 LULUCF

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	2	2	2	2	2	2	3	2	2	2
MD	1	2	3	3	5	5	5	5	4	4	4
HD	1	1	1	1	1	1	0	0	0	0	0
MostD	0	0	0	0	0	0	0	0	0	0	0
Emission trend	22.5	30.2	24.3	29.7	27	33.1	10.8	16	25.3	13.8	

6.10 Agriculture

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
LD	1	1	1	1	1	1	2	3	3	3	3
MD	1	2	2	2	3	3	2	2	1	1	1
HD	0	0	0	0	0	0	0	0	0	0	0
MostD	0	0	0	0	0	0	0	0	0	0	0
Emission trend	87.8	88	91	94.7	98.2	95.6	91.2	91.3	89.3	90.1	

7 The Average of Instrument Numbers at the National Level

7.1 The scores under sectoral at an average 1997-2007

	Average
Energy-Stationary	7.043065
Energy-Transport	7.192446
Energy-Fugitive	6.012121
Industrial Process	7.469697
Agriculture	5.068182
Waste	7.365152
LULUCF	6 25303
Total average	6.629099
Total numbers	17

7.2 Total scores of national levels 1997-2007

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Greenhouse Gas Abatement Program			5	5	5	5	5	5	5	5	5
Greenhouse Friendly Program					7	7	7	7			
Low Emissions Technology Demonstration Fund					3	3					
International Climate Change		7	7	7	7	7	7	7	7	7	7
Greenhouse GCP Plus									9	9	9
Local Greenhouse Action	7	7	7	7	7	7	7	7	7	7	7
Government Operation	9	9	9	9	9	9	9	0	9	9	9
Energy Market Reform					15	15	15	15	15	15	15
Generator Efficiency Standard				7	7	7	7	7			
Renewable Energy Development Initiative (REDI)									2	2	2
Mandatory Renewable Energy Target (MRET)					14	14	14	14	14	14	14
Energy Performance Codes for domestic appliance (NAEEEP)	13	13	13	13	13	13	13	13	13	13	13
Energy Efficiency Best Practice and Benchmarking Program (EEBP)		5	5	5	5	5	5				
Eco-Efficiency Program									3	3	3

Queensland Centre for Low Emission Technology							2	2	2	2	2
National Framework for Energy Efficiency (NFEE)								12	12	12	12
Energy Efficiency Opportunities Program (EEO)										10	10
Low Emission Technology and Abatement Program (LETAP)										2	2
Advanced Electricity Storage Technologies Program (ARSTP)									2	2	2
Solar Cities									2	2	2
Wind Energy Forecasting Capability Initiative								2	2	2	2
Strategic Development of Renewable Energy	2	2	2	2	2	2	2	2	2	2	2
START Program						8	8	8	8	8	8
Australia's Onshore Energy Security Program											8
National Cycling Strategy (NCS)	8	8	8	8	8	8	8	8	8	8	8
Motor Vehicle Environment Committee (MVEC) Strategy			8	8	8						
Diesel and Alternative Fuels Grants Scheme				4	4	4					
Alternative Fuels Conversion Program				12	12	12	12	12	12	12	12
CNG Infrastructure Program				2	2	2	2	2			
Energy Grants (credits) Scheme							4	4	4		
Bio-fuels Capital Grants Program							5	5			
350ML Bio-fuels Target							10	10	10	10	10
Ethanol Distribution Program										7	7
LPG Conversion Grants										5	5
Strategic Transport Planning & Development								6	6	6	6
Plantations for Australia-the 2020 vision	8	8	8	8	8	8	8	8	8	8	8
The Farm Forestry Program by NHT	10	10	10	10	10	10					
Bush for Greenhouse		2	2	2	2	2	2	2			
National Action Plan for Salinity and Water Quality					9	9	9	9	9	9	9
Greenhouse Action in Regional Australia								4	4	4	4
National Landcare Program	4	4	4	4	4	4	4	4	4	4	4
Greenhouse and Agriculture Taskforce	6	6	6	6	6	6					
Rumen Modifiers	3	3	3	3	3	3	3	3	3	3	3
Environmental Management Systems (EMS) under NHT							4	4	4	4	4

Ozone Protection and Synthetic Greenhouse Gas Management	10	10	10	10	10	10	10	10	10	10	10
NHT-waste management awareness program	5	5	5	5	5	5					
Australian Government state and local waste strategies	10	10	10	10	10	10	10	10	10	10	10
Greenhouse Challenge	5	5	5	5	5	5	5	5			
Ethanol Production Program						4	4	4	4	4	4
COAL 21 National Action Plan							6	6	6	6	6
Diesel Fuel Rebate Scheme			4	4	4	4					
Tax Fuels Scheme										4	4

7.3 The score under the Energy-Stationary

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Government Operation	9	9	9	9	9	9	9		9	9	9
Local Greenhouse Action-stationary energy element	7	7	7	7	7	7	7	7	7	7	7
Energy Market Reform					15	15	15	15	15	15	15
Generator Enfficiency Standard				7	7	7	7	7			
Renewable Energy Development Initiative (REDI)									2	2	2
MRET					14	14	14	14	14	14	14
Energy Performance Codes for domestic applicance (NAEEP)	13	13	13	13	13	13	13	13	13	13	13
Energy Efficiency Best Practice and Benchmarkeing Program (EEBP)		5	5	5	5	5	5				
Eco-Efficiency Program									3	3	3
Low Emissions Technology Demonstration Fund (LETDF)					3	3					
Queensland Center for Low Emission Technology							2	2	2	2	2
Naitonal Framework for Energy Efficiency (NFEE)								12	12	12	12
Energy Efficiency Oppurtunities Program (EEO)										10	10
Low Emission Technology and Abatement Program (LETAP)										2	2
Advanced Electricity Storage Technologies Program (ARSTP)									2	2	2
Solar Cities									2	2	2
Wind Energy Forecasting Capability Institutive								2	2	2	2
Strategic development of renewable energy	2	2	2	2	2	2	2	2	2	2	2
GGAP			5	5	5	5	5	5	5	5	5
Greenhouse Challenge Program	5	5	5	5	5	5	5	5			

Greenhouse Challenge Plus									9	9	9
START program						8	8	8	8	8	8
Australia's Onshore Energy Security Program											8
COAL 21 National Action Plan							6	6	6	6	6
Greenhouse Friendly Program					7	7	7	7			
International climate change		7	7	7	7	7	7	7	7	7	7

7.4 The score under the Energy-Transport

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
National Cycling Strategy (NCS)	8	8	8	8	8	8	8	8	8	8	8
Motor Vehicle Environment Committee (MVEC) Strategy			8	8	8						
Diesel and Alternative Fuels Grants Scheme				4	4	4					
Energy Grants (credits) Scheme							4	4	4		
Tax Fuels Scheme										4	4
Alternative Fuels Conversion Program				12	12	12	12	12	12	12	12
CNG Infrastructure Program				2	2	2	2	2			
Energy Grants (credits) Scheme							4	4	4		
Bio-fuels Capital Grants Program							5	5			
350ML Bio-fuels Target							10	10	10	10	10
Ethanol Distribution Program										7	7
Ethanol Production Program						4	4	4	4	4	4
LPG Conversion Grants										5	5
Strategic Transport Planning & Development								6	6	6	6
Greenhouse Gas Abatement Program			5	5	5	5	5	5	5	5	5
Greenhouse Challenge Program	5	5	5	5	5	5	5	5			
Greenhouse Challenge Plus									9	9	9
Greenhouse Friendly Program					7	7	7	7			
International climate change		7	7	7	7	7	7	7	7	7	7
Low Emissions Technology Demonstration Fund					3	3					
Local Greenhouse Action	7	7	7	7	7	7	7	7	7	7	7

7.5 The score under Fugitive

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Low Emissions Technology Demonstration Fund					3	3					
Greenhouse Gas Abatement Program			5	5	5	5	5	5	5	5	5
Greenhouse Challenge Program	5	5	5	5	5	5	5	5			
Greenhouse Challenge Plus									9	9	9
Greenhouse Friendly Program					7	7	7	7			
International climate change		7	7	7	7	7	7	7	7	7	7

7.6 The score under the Industrial Process

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Ozone Protection and Synthetic Greenhouse Gas Management	10	10	10	10	10	10	10	10	10	10	10
NHT-waste management awareness program	5	5	5	5	5	5					
Australian Government state and local waste strategies	10	10	10	10	10	10	10	10	10	10	10
Greenhouse Gas Abatement Program			5	5	5	5	5	5	5	5	5
Greenhouse Challenge Program	5	5	5	5	5	5	5	5			
Greenhouse Challenge Plus									9	9	9
Greenhouse Friendly Program					7	7	7	7			
International climate change		7	7	7	7	7	7	7	7	7	7

7.7 The score under Agriculture

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Greenhouse and Agriculture Taskforce	6	6	6	6	6	6					
Rumen Modifiers	3	3	3	3	3	3	3	3	3	3	3
Greenhouse Action in Regional Australia								4	4	4	4
Environmental Management Systems (EMS) under NHT							4	4	4	4	4
Greenhouse Friendly Program					7	7	7	7			
International climate change		7	7	7	7	7	7	7	7	7	7

7.8 The score under the waste

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
NHT-waste management awareness program	5	5	5	5	5	5					
Australian Government state and local waste strategies	10	10	10	10	10	10	10	10	10	10	10
Greenhouse Challenge Program	5	5	5	5	5	5	5	5			
Greenhouse Challenge Plus									9	9	9
Greenhouse Friendly Program					7	7	7	7			
International climate change		7	7	7	7	7	7	7	7	7	7

7.9 The score under the LULUCF

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Plantations for Australia-the 2020 vision	8	8	8	8	8	8	8	8	8	8	8
The Farm Forestry Program by NHT	10	10	10	10	10	10					
Bush for Greenhouse		2	2	2	2	2	2	2			
National Action Plan for Salinity and Water Quality					9	9	9	9	9	9	9
Greenhouse Action in Regional Australia								4	4	4	4
National Landcare Program	4	4	4	4	4	4	4	4	4	4	4
Greenhouse Gas Abatement Program			5	5	5	5	5	5	5	5	5
Greenhouse Friendly Program					7	7	7	7			
International climate change		7	7	7	7	7	7	7	7	7	7

8 Percentages of Using Elements by the Criteria

Information	Education	Incentives	Target settings	Timeframe	Guidelines	Monitoring	Reporting	Auditing	Public Disclosure (mandatory)	Contractual Improvement (mandatory)	Market Device	Regulation	Penalty of polluter pays	Penalty for Nonparticipation	Penalty for Noncompliance	Penalty for Failure to Meeting Targets
65%	65%	94%	33%	37%	65%	42%	40%	90%	12%	4%	19%	23%	2%	6%	19%	6%
65.4	65 4	94 2	32 7	36 6	65 4	42 3	40 4	90 4	11 5	3 9	19 2	23 1	1 9	5 8	19 2	5 8